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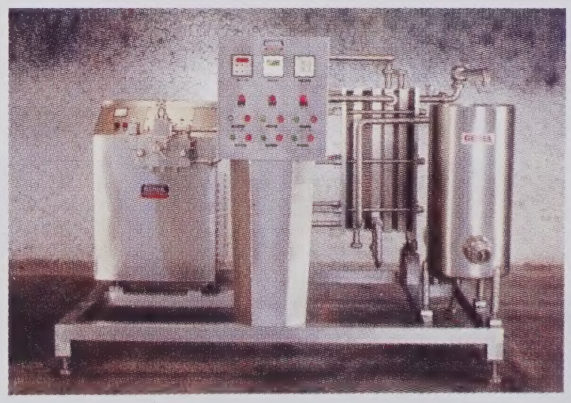

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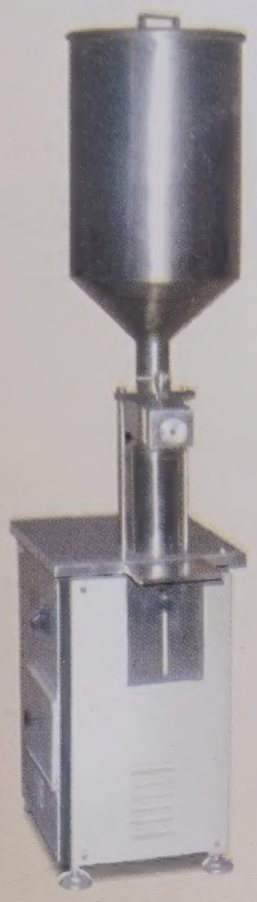

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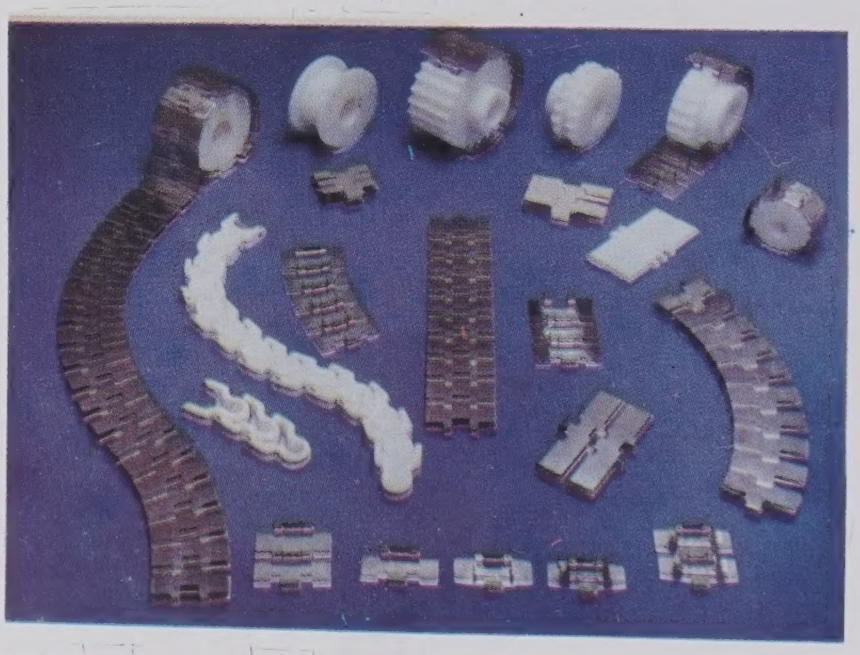

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November 21 - 24, 2001

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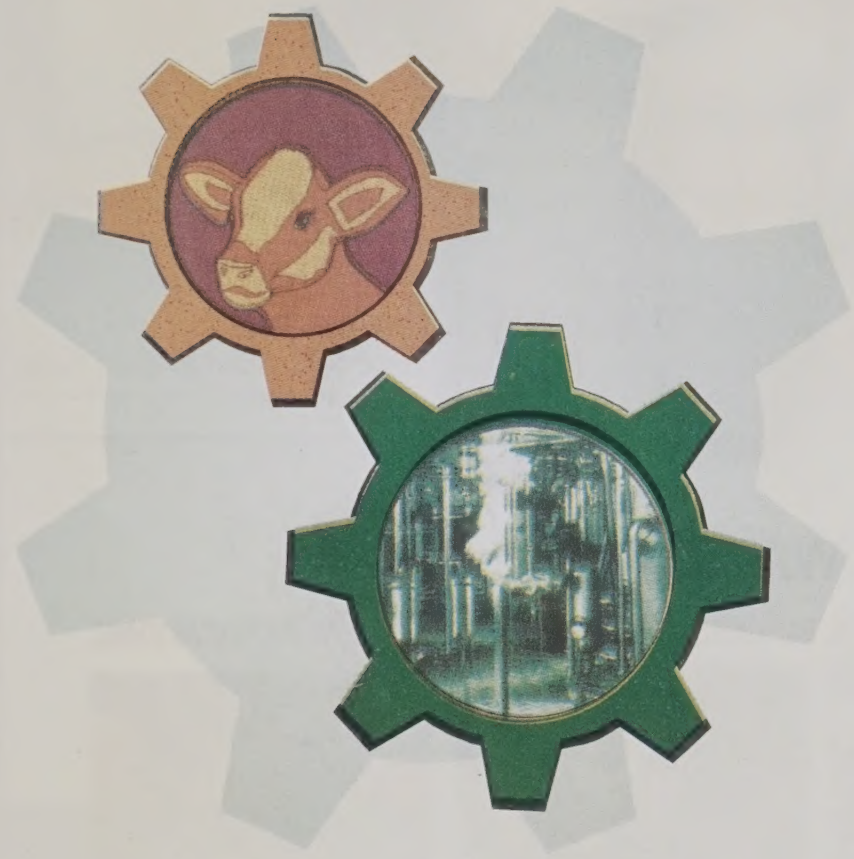

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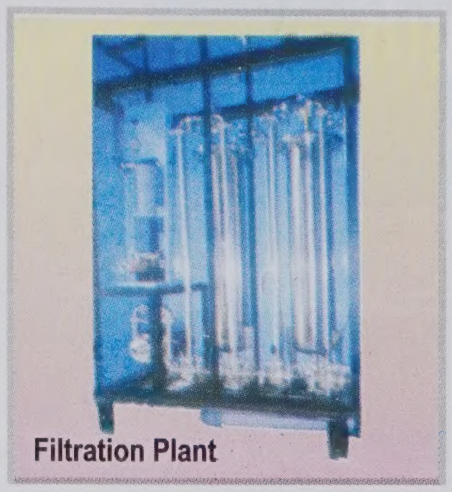
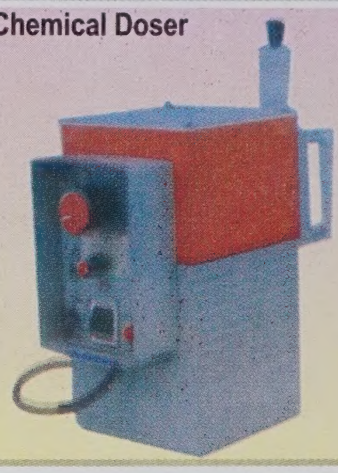

Filtration Plant

Softener / DM Plant

P.O.E / P.O.U System

Chemical Doser



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The 4th Indian Food & Food Technology Fair.
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FOODPRO 2001- Highlights

• 4-Day International Exhibition • Technical Sessions & Technology Forums • Food & Beverage Retailing Showcase • Conferences & Investment Seminars • 150 plus Exhibitors Representing Food, Food Technology, Agro Dairy & related Food Businesses.

Sectoral Focus

• Food & Food Processing • Dairy • Agri Business & Agro Products • Bakery • Beverages, Confectionery & Grocery.

Exhibitors Profile

a) Equipments, Technology and Machinery for Food and Food Processing, Dairy, Poultry, Fruits & Vegetables etc.

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• Refrigeration & Cold Chain System
• Storage, Handling & Transportation

b) Processors, Manufacturers and Exporters

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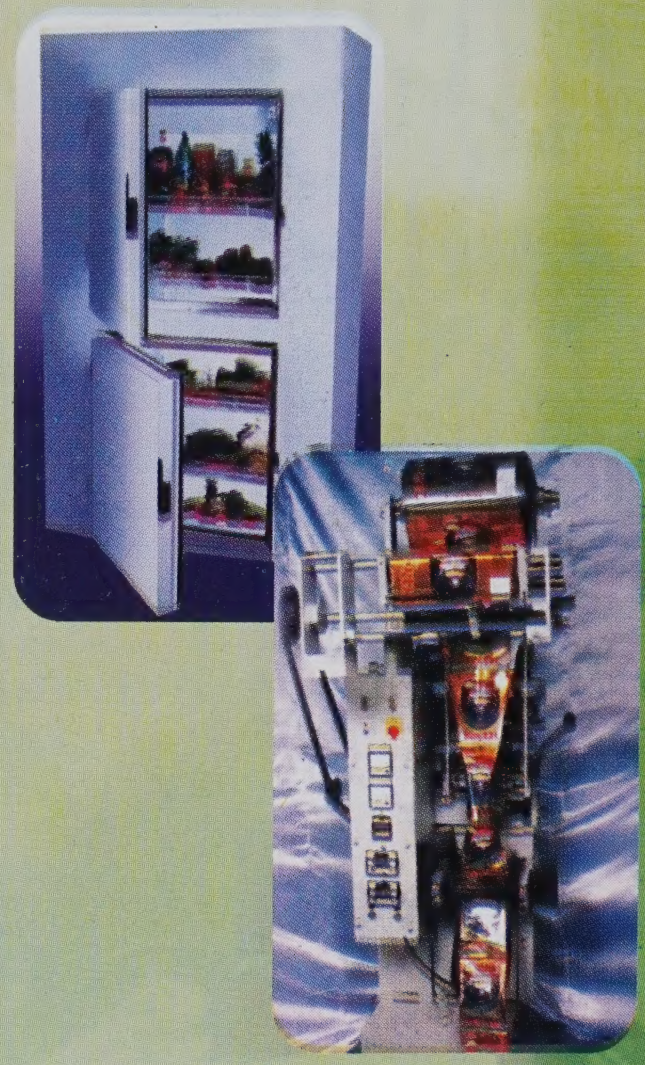
• Dairy Products • Marine Products • Meat Products
• Processed Fruits etc.

c) Hotel & Kitchen Equipments

d) Government and Government Agencies (State & Central Govt.)

e) Commodity Development Boards & Export Development Agencies and Others.



Parallel Events (Planned)

• Fruit Pavilion • Fresh Juice Pavilion • Coffee Festival • Tea Tamasha • Pizza Fest • Food & Beverage - Retail / Showcase and more.....

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Exhibition Details

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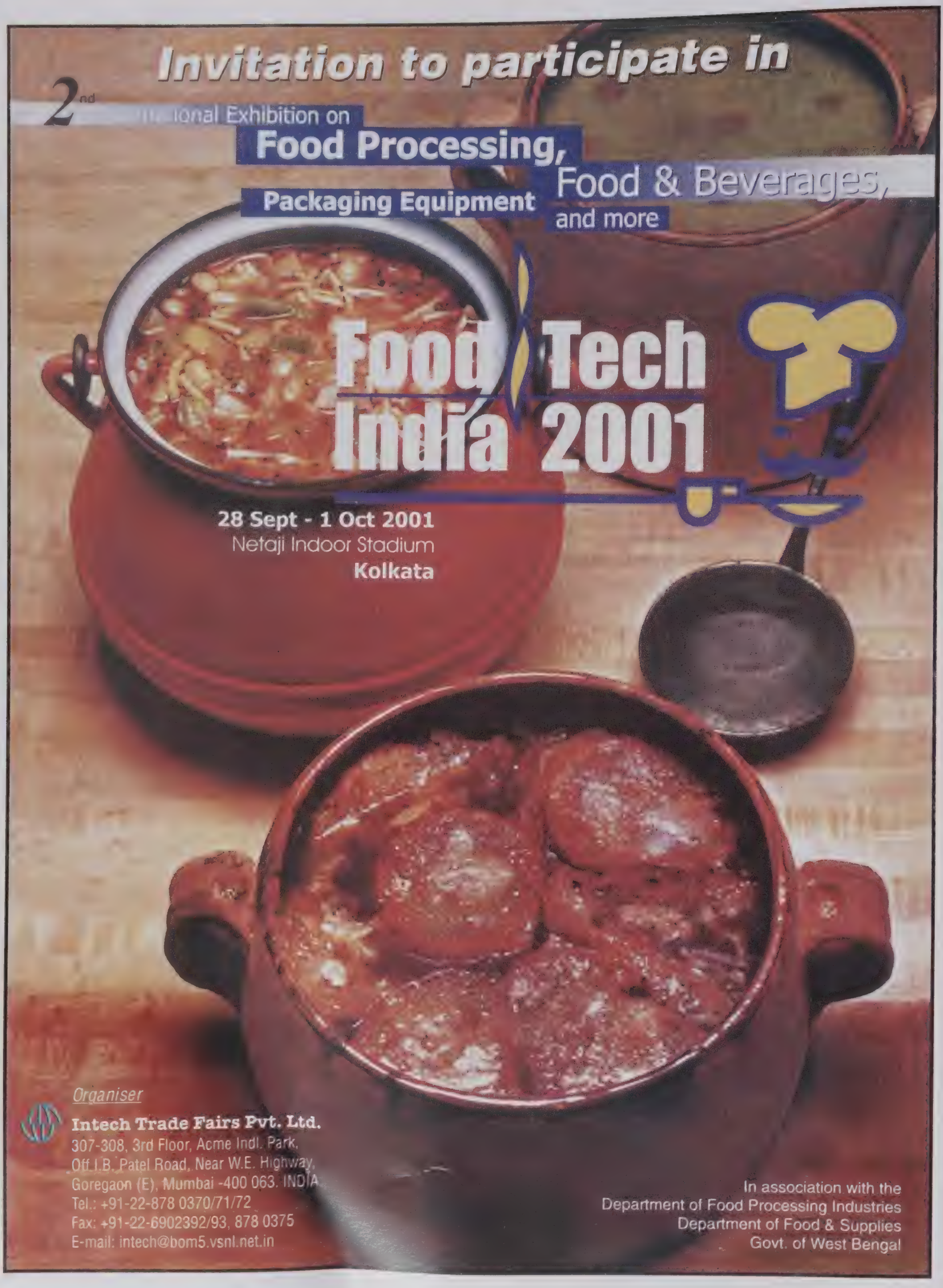
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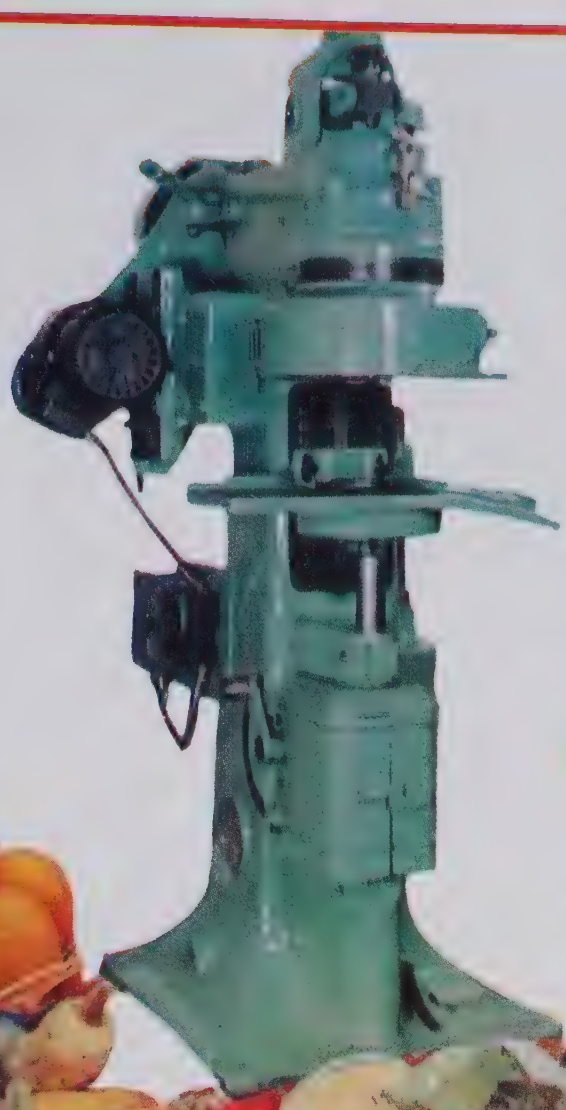

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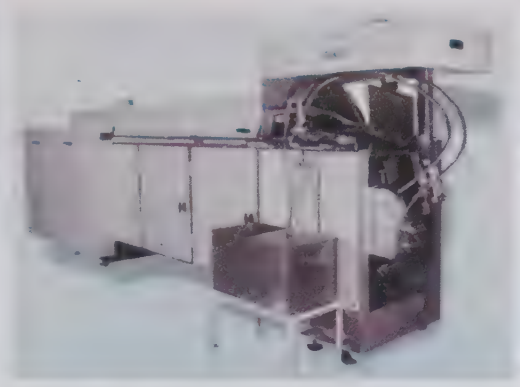

ZWA / ZW: Automatic Wafer baking Machine

WT: Manual baking tongs

Ideas for Wafer & Cones

Baking Machines for
Cream Wafer Biscuits
& Ice Cream Cones

ZA: Automated baking Machine

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Editorial...

With the lifting of qualitative restrictions (QR) on imports of 61 agricultural and meat products, the Indian food processing sector will have to gear up to meet the challenges ahead. Moreover, the stringent quality, food safety norms and contamination limits, besides tariff and cost hurdles, are some of the tests Indian exporters will have to face on the global scene for a place in the international market.

Globalisation, structural transformation, increasing competition, efficiency and concentration — these are the descriptors for industrial change. When we take a closer look at industrial change, it's interesting to see how it's not only the really big, globally operating firms which come up with global product concepts, but also — and increasingly — companies which until very recently had a purely national focus. With mergers and takeovers, companies are attempting to become bigger and bigger, faster and faster. To become successful in a market segment, they have to keep coming up with path-breaking achievements. The upheavals throughout the industry make it obvious that the different market segments are intermingling. Categories which used to be clearly differentiated, like the milk, beverage or ice cream industries, are growing together and coalescing.

Indian food industry has still a long way to go to make an impact. Countries like China, Korea, Thailand, Malaysia which were much behind India during the fifties and sixties are way ahead of us now in food industry development. Unless we adopt policies which are successful elsewhere, we will not be able to improve the present 2-3% utilisation of agricultural produce for value-additions through processing. The existence of multifarious laws and multiple authorities is a major hurdle. In the context of liberalisation, these laws throttle development. Appropriate policies and schemes could be envisaged for establishment of cold chain and developmental related infrastructure, development and transfer of new technologies and product specific packaging, development of appropriate processable varieties of raw material, bringing about future's trading and equalisation as well.

There have been major developments in packaging since the fifties. In addition to its function in transport and as a protection against environmental influences, packaging has now acquired a series of other functions. The "package" must attract attention, it must provide information, it must gain the buyer's favours and facilitate consumption of the product. Though there has been rapid growth and competition in recent times in the packaged and branded food products, this growth has to be sustained. Food packaging has to focus on cost reduction global regulatory policies on food contact safety, minimise atmospheric pollution and deal effectively with package waste management.

✍ **Editor**

Global Standards for Food Packaging

by
K.R. Kumar

Abstract:
Standardization in food packaging has assumed great importance in the global distribution cycle. The benefits of standardization include consistent quality and service, safety and health of consumers and promotion of trade. In India, significant achievements have been made in formulating standards in the food field, as regards products and packages. The International Standards Organization (ISO) is the nodal body responsible for coordination and unification of standards. The five technical committees within ISO are responsible for publishing standards on packaging. The significance of ISO 9000 series is mentioned. List of relevant national and international standards are provided.

A standard is defined as: A technical specification or other document available to the public, drawn up with the co-operation and consensus or general approval of all interests affected by it, based on the consolidated results of science, technology and experience, aimed at the promotion of optimum community benefits and approved by a body recognised on the national, regional or international level.

A voluntary standard can be incorporated into a contract or regulation and its provisions thus become mandatory. The standards are intended to promote communication, efficiency, quality, safety and health, free trade and environmental protection. Thus, the aims or purposes of standardization and commercial benefits are:

1. Provision of means of communication among all interested parties
2. Promotion of economy in human effort, materials and energy in the production and exchange of goods
3. Protection of consumer interests through adequate and consistent quality of goods and services
4. Promotion of quality of life safety, health and the protection of the environment
5. Promotion of trade removal of barriers caused by differences in national practices.

National standards

Significant progress has been made in India in formulating standards on packaging in various areas, especially in the food field. Specifications have been formulated for food commodities such as cereals, pulses, wheat products, snack foods and many traditional foods. These include a clause on packaging. Standards for packaging include metal containers, glass containers, tea chest and wooden boxes, jute sacks as well as paper, both plain and coated. Glossaries of terms used in flexible packages, paper and allied products and plastics have already been published.

A significant development is the formulation of standards concerning hygiene and safety regarding constituents of packaging materials and plastics. The lists of these are presented in Table 1.

Research and development

The requirements of a package are that it should protect the contents during transportation and storage, be capable of easy handling and storage, be produced at economical cost and have attractive appearance. The package must afford protection to the packed foods against a variety of conditions including deleterious effects of water vapour, oxygen, temperature and light, mechanical shocks and vibration during transportation. When designing a package, the intended area of distribution, shelf life required and the target market are to be considered. Also, it is necessary to have details of the machinery with which the products will be filled and sealed and to assess the type of handling and storage conditions to which it will be subjected to. It is apparent from the above, that research has a fundamental and vital part to play.

Packaging for export

Foreign buyers have the choice of importing from all over the world and hence the package must come up to international standards. Apart from sales appeal and attractive container designs, due importance must be attached, from technological angle to corrosion preventive techniques, possible deterioration arising from environmental hazards, protection against physical damage and also reduction of shipping container sizes to save freight costs.

The relevant Indian standards on packaging of foods listed by BIS are shown in Table 2.

International standards

The International Standards Organisation (ISO) established in 1947 is the worldwide federation of national standards bodies formed to facilitate international coordination and unification of standards. BIS is a member body entitled to participate and exercise full voting rights on any technical committee of ISO.

Five technical committees have developed ISO standards directly concerned with packaging.

TC 51 : Pallets for unit load method of materials handling (9 standards) vide Table 3.
TC 52 : Light gauge metal containers (35 vide Table 4)
TC 63 : Glass containers (151, Table 5)
TC 104: Freight containers (18, Table 6)
TC 122: Packaging. This committee with the broadest scope, works to standardize packaging terminology and definitions, as well as packaging dimensions, performance, requirements and tests. But excludes matters falling within the scope of other committees. The standards are listed in Table 7.

ISO 9000 series:

In 1979, the ISO formed Technical Committee ISO/TC 176 on Quality Management and Quality Assurance to develop a single, generic series of quality system standards that would be used for external quality assurance purposes. In 1987, ISO published the 9000 standards series on quality management and assurance. This series has the greatest impact on global score.

The ISO 9000 series on QS models are given in Table 8, while series guidelines are given in Table 9.

Table 1. List of Indian Standards on Plastics Suitable for Use in Contact with Foodstuffs, Pharmaceuticals and Drinking Water

IS NO.	Title
9833 : 1981	List of pigments and colorants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water

Head, Food Packaging Technology Department, Central Food Technological Research Institute, Mysore 570 013.

9845	1998	Determination of overall migration of constituents of plastic materials and articles intended to come into contact with foodstuffs – method of analysis (second-revision)
10141	1982	Positive list of constituents of polyethylene in contact with foodstuffs, pharmaceuticals and drinking water (first revision is under wide circulation)
10142 :	1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water (first-revision)
10146 :	1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10148 :	1982	Positive list of constituents of polyvinyl chloride and co-polymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
10149 :	1982	Positive list of constituents of polystyrene (crystal and high impact) in contact with foodstuffs, pharmaceuticals and drinking water (Amendment No.1 is under print)
10151 :	1982	Polyvinyl chloride (PVC) and its co-polymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
10171 :	1999	Guide on suitability of plastics for food packaging (second revision)
10909 :	1984	Positive list of constituents of polypropylene and its co-polymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water (first revision is under wide circulation)
10910 :	1984	Polypropylene and its co-polymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 :	1985	Ionomers resins for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
11435 :	1985	Positive list of constituents of ionomer resins for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704 :	1986	Ethylene/acrylic acid (EAA) co-polymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
11705 :	1986	Positive list of constituents of Ethylene/acrylic acid (EAA) co-polymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
12229 :	1987	Positive list of constituents of polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247 :	1988	Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12248 :	1988	Positive list of constituents of Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252 :	1987	Polyalkylene terephthlates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
13449 :	1992	Positive list of constituents of ethylene vinyl acetate (EVA) co-polymers in contact with foodstuffs, pharmaceuticals and drinking water
13576 :	1992	Ethylene methacrylic and (EMAA) co-polymers and terpolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
13577 :	1992	Positive list of constitutents of ethylene methacrylic (EMAA) co-polymers and terpolymers in contact with foodstuffs, pharmaceuticals and drinking water
13601 :	1993	Ethylene vinyl acetate (EVA) co-polymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

Table 2. BIS Standards on Packaging Related to Foodstuffs

1. Packaging materials

IS 1060	1960	Methods of sampling and test for paper and allied products (Parts 1-3)
IS 2508	1984	Low density polyethylene films
IS 3395	1997	Low density polyethylene (LDPE) and linear low density polyethylene (LLDPE) materials for moulding and extrusion
IS 4006	1985	Methods of the test for paper and pulp based packaging materials (Parts 1-3)
IS 7328 :	1992	High density polyethylene materials for moulding and extrusion
IS 8970 :	1991	Aluminium foil laminates for packaging
IS 10171 :	1987	Guide on suitability of plastics for food packaging
IS 10889 :	1984	High density polyethylene films
IS 14129 :	1994	Flexible packaging materials for the packaging of vanaspati in 10 kg and 15 kg packs
IS 14500 :	1998	Linear low density polyethylene (LLPDE) films
IS 14534 :	1998	Guidelines for recycling plastics

2. Packages

IS 2034 :	1987	Round open top sanitary cans for butter and cheese
IS 3728 :	1985	Wooden boxes for packaging of apples
IS 7031 :	1987	Method of conditioning for testing of complete, filled transport packages.
IS 8113 :	1976	Primary cartons for packaging butter
IS 8688 :	1988	Plastic potable water bottles
IS 9313 :	1979	Corrugated fibre board boxes for the export packaging of glass jars
IS 9396 :	1987	Round open top sanitary cans for processed foods (Parts 1 & 2)
IS 9738 :	1990	Polyethylene bags for general purposes
IS 10402 :	1982	Pine-needle hardboard boxes for packaging of apples
IS 11078 :	1993	Round open top sanitary cans for milk powder
IS 11584 :	1986	High density polyethylene crates for milk sachets
IS 12212 :	1987	Corrugated fibre board boxes for transport packaging of butter packed in primary cartons
IS 14537 :	1998	Polyethylene terephthalate (PET) bottle for packaging of alcoholic liquors.

3. Specific products

IS 10106 : (Part 1)	1982	Packaging code : Part 1. Factors affecting the selection of packaging
IS 10106 : (Part 1/Sec1)	1990	Packaging code : Part 1. Product packaging, Sec 1. Foodstuffs and perishables
IS 10106 : (Part 1/Sec2)	1986	Packaging code : Part 1. Product packaging, Sec 2, Tobacco and tobacco products
IS 10106 : (Part 1/Sec 3)	1986	Packaging code : Part 1. Product packaging, Sec 3, Textiles, fabrics and allied products
IS 10106 : (Part 1/Sec 4)	1995	Packaging code : Part 1. Product packaging, Sec 4, Packaging cushioning design
IS 10106 : (Part 1/Sec 5)	1990	Packaging code : Part 1. Product packaging, Sec 5, Marking, addressing and identification
IS 10106 : (Part 1/Sec 6)	1992	Packaging code : Part 1. Product packaging, Sec 6, Protection against spoilage of packages and their contents by micro-organisms, insects, mites and rodents
IS 10106 : Part 2/Sec 1)	1985	Packaging code : Part 2. Packaging materials, Sec 1. Metals
IS 10106 : (Part 2/Sec 2)	1983	Packaging code : Part 2. Packaging materials, Sec. 2. Paper and paper boards
IS 10106 : (Part 2/Sec 3)	1984	Packaging code : Part 2. Packaging materials, Sec. 3. Plastic materials
IS 10106 : (Part 2/Sec 4)	1986	Packaging code : Part 2. Packaging materials, Sec 4. Fabrics/textiles
IS 10106 : (Part 2/Sec 5)	1990	Packaging code : Part 2. Packaging materials, Sec. 5. Wood and plywood
IS 10106 : (Part 2/Sec 6)	1990	Packaging code. Part 2. Packaging materials, Sec. 6. Flexible laminates
IS 10106 : (Part 3/Sec 1)	1984	Packaging code : Part 3. Ancillary materials, Sec. 1. Cushioning materials
IS 10106 : (Part 3/Sec 2)	1986	Packaging code : Part 3. Ancillary materials, Sec. 2. Adhesive tapes for closing and sealing
IS 10106 : (Part 3/Sec 3)	1985	Packaging code : Part 3. Ancillary materials, Sec. 3. Tensional strapping.
IS 10106 : (Part 3/Sec 4)	1988	Packaging code : Part 3. Ancillary materials, Sec. 4. Desiccants
IS 10106 :	1990	Packaging code : Part 3. Ancillary materials,

(Part 3/Sec 5)		Sec. 5. Twines and cords
IS 10106	: 1982	Packaging code : Part 4. Packages, Sec.1.
(Part 4/Sec 1)		Metal containers
IS 10106	: 1984	Packaging code : Part 4. Packages, Sec 2. Paper and
(Part 4/Sec 2)		Paper based packages
IS 10106	: 1984	Packaging code : Part 4. Packages,
(Part 4/Sec 3)		Sec 3. Plastics
IS 10106	: 1984	Packaging code : Part 4. Packages, Sec. 4.
(Part 4/Sec 4)		Glass containers
IS 10106	: 1986	Packaging code : Part 4. Packages, Sec 5.
(Part 4/Sec 5)		Wooden containers
IS 10106	: 1986	Packaging code : Part 4. Packages, Sec 6.
(Part 4/Sec 6)		Sec 6. Fabrics/textiles
IS 11352	: 1998	Flexible pouches for the packing of vanaspati up to 5 kg or 5 litres
IS 11905	: 1989	Polyethylene pouches for packaging liquid milk

4. Glossary / Terminology

IS 4261	: 1967	Glossary of terms relating to paper and pulp based packaging materials
IS 6654	: 1992	Glass containers – glossary of terms
IS 6703	: 1972	Glossary of wooden packaging terms
IS 7019	: 1998	Glossary of terms in plastics and flexible packaging, excluding paper
IS 7186	: 1973	Glossary of terms relating to paper and flexible packaging
IS 9111	: 1979	Glossary of terms and classification pertaining to transport packaging
IS 11343	: 1994	Packaging – sacks made from thermoplastic films – vocabulary

Table 3. ISO Standards for General Purpose Pallets (TC 51)

ISO 445	Pallets for materials handling – vocabulary
ISO 6780	General purpose flat pallets for through transit of goods – principal dimensions and tolerance
ISO 8611	General purpose flat pallets for through transit of goods – test methods
ISO/TR 10232	General purpose flat pallets for through transit of goods – design rating and maximum working load
ISO/TR 10233	General purpose flat pallets for through transit goods – performance requirements
ISO/TR 10234	General purpose flat pallets for through transit of goods – phytosanitary (plant health) requirement for wooden pallets
ISO/TR 11444	Quality of sawn wood used for the construction of pallets
ISO/TR 12776	Pallets – slip sheets
ISO 12777-1	Methods of test for pallet joints – Part 1 : determination of bending resistance of pallet nails, other dowel-type fasteners and staples

Table 4. ISO Standards for Light Gauge Metal Containers (TC 52)

ISO 90-1	Light - gauge metal containers – Definitions and determination methods for dimensions and capacities – Part 1: open top cans
ISO 90-2	Light - gauge metal containers – Definitions and determination methods for dimensions and capacities – Part 2 : general use containers
ISO 1361	Light - gauge metal containers – open top cans – round cans – internal diameters
ISO 3004-1	Light - gauge metal containers.– capacities and related cross sections – Part 1 : Open top cans for general food.
ISO 3004-2	Light - gauge metal containers capacities and related cross sections – Part 2 : Open top cans for meat and products containing meat for human consumption.
ISO 3004-3	Light - gauge metal containers – Capacities and related cross sections – Part 3 : Open top cans for drinks
ISO 3004-4	Light - gauge metal containers – Capacities and related cross sections – Part 4 : Open top cans for edible oil
ISO 3004-5	Light - gauge metal containers - Capacities and related cross sections – Part 5 : Open top cans for fish and other fishery products
ISO 3004-6	Light - gauge metal containers – Capacities and related cross sections – Part 6 : Open top cans for milk
ISO/TR 8610	Light - gauge metal containers – Round vent-hole cans with soldered ends for milk and milk products – capacities and related diameters
ISO/TR 10193	Round - general use light gauge metal containers – nominal filling volumes and nominal diameters
ISO/TR 10194	Non-round. general use light gauge metal containers – nominal filling volumes and nominal cross sections
ISO 10653	Light - gauge metal containers – Round open top cans – cans defined by their nominal gross lidded capacities
ISO 10654	Light - gauge metal containers – Round open top cans – cans for liquid products with added gas, defined by their nominal filling volumes.
ISO/TR 11761	Light - gauge metal containers – Round open top cans – classification of can sizes by construction type.
ISO/TR 11762	Light - gauge metal containers – Round open top cans – cans for liquid products with added gas – classification can sizes by construction type.
ISO/TR 11776	Light - gauge metal containers – Non-round open top cans – cans defined by their nominal capacities.
ISO 11944	Round - general use light gauge metal containers – nominal diameters for cylindrical and tapered cans up to 10,000 ml capacity.

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Table 5. ISO Standards for Glass Containers (TC 63)

ISO 7348	Glass containers – manufacture – vocabulary
ISO 7458	Glass containers – Internal pressure resistance – test methods
ISO 7459	Glass containers – Thermal shock resistance and thermal shock endurance – test methods
ISO 8106	Glass containers – Determination of capacity by gravimetric methods – test method
ISO 8113	Glass containers – Resistance to vertical load – test method
ISO 8162	Glass containers – Tall crown finishes – dimensions
ISO 8163	Glass containers – Shallow crown finishes – dimensions
ISO 8164	Glass containers – 520 ml Euro-form bottles – dimensions
ISO 9008	Glass containers – Vertically – test method
ISO 9009	Glass containers – Height and Non-parallelism of finish with reference to container base – test methods
ISO 9056	Glass containers – Series of pilferproof finish – dimensions
ISO 9057	Glass containers – 28 mm tamper – evident finish for pressurized liquids – dimensions
ISO 9100	Wide-mouth glass containers – vacuum lug finishes – dimensions
ISO 9885	Wide mouth glass containers – Deviation from flatness of top sealing surface – test methods.

Table 6. ISO Standards for Freight Containers (TC 104)

ISO 668	Series 1 Freight containers – classification, dimensions and ratings
ISO 830	Freight containers – terminology
ISO 1161	Series 1 Freight containers – Corner fittings – specifications
ISO 1496-1	Series 1 Freight containers – Specification and testing – Part 1: general cargo containers for general purposes
ISO 1496-2	Series 1 Freight containers – Specification and testing – Part 2 : thermal containers
ISO 1496-3	Series 1 Freight containers – Specification and testing – Part 3 : Tank containers of liquids, gases and pressurized dry bulk.
ISO 1496-4	Series 1 Freight containers – Specification and testing – Part 4 : Non-pressurized containers for dry milk
ISO 1496-5	Series 1 Freight containers – Specification and testing – Part 5 : Platform and Platform based containers
ISO 3874	Series 1 Freight containers – Handling and securing
ISO 6346	Freight containers – coding, identification and marking
ISO 8323	Freight containers – Air / surface (intermodal) general-purpose containers – specification and tests
ISO 9669	Series 1 : Freight containers – Interface connections for tank containers
ISO 9711-1	Freight containers – Information related to containers on board vessels – Part 1 : Bay plan system
ISO 9711-2	Freight containers – Information related to containers on board vessels – Part 2 : Telex data transmission
ISO 9897-1	Freight containers – container equipment data exchange (CEDEX) – Part 1 : general communication codes
ISO 9897-3	Freight containers – container equipment data exchange (CEDEX) – Part 3 : Message types for electronic data interchange
ISO 10368	Freight-thermal containers – Remote condition monitoring
ISO 10374	Freight containers – Automatic identification

Table 7. ISO Standards for Packaging in General (TC 122)

ISO 780	Packaging – Pictorial marketing for handling of goods
ISO 2206	Packaging – Complete, filled transport packages – Identification of parts when testing
ISO 2233	Packaging – complete, filled transport packages – Conditioning for testing
ISO 2234	Packaging – complete, filled transport packages – Stacking tests using static load
ISO 2244	Packaging – complete, filled transport packages – Horizontal impact tests (horizontal or inclined plane test; pendulum test)
ISO 2247	Packaging – complete, filled transport packages – Vibration test at fixed low frequency
ISO 2248	Packaging – complete, filled transport packages – Vertical impact test by dropping
ISO 2873	Packaging – complete, filled transport packages – Low pressure test
ISO 2875	Packaging – complete, filled transport packages – Water spray test
ISO 2876	Packaging – complete, filled transport packages – Rolling test
ISO 3394	Dimensions of rigid rectangular packages – Transport packages
ISO 3676	Packaging – Unit load sizes – Dimensions
ISO 4178	Complete, filled transport packages – Distribution trials – Information to be recorded
ISO 4180-1	Complete, filled transport packages – General rules for the compilation of performance test schedules – Part 1 : General principles
ISO 4180-2	Complete, filled transport packages – General rules for the compilation of performance test schedules – Part 2 : Quantitative data
ISO/TR 828-1	Packaging – estimating the filled volume using the flat dimensions – Part 1 : Paper sacks
ISO 8317	Child resistant packaging – Requirement and testing procedures for reclosable packages
ISO 8318	Packaging – Complete, filled transport packages – Vibration tests using a sinusoidal variable frequency
ISO 8474	Packaging – Complete, filled transport packages – Water immersion test
ISO 8768	Packaging – Complete, filled transport packages – Toppling test
ISO 10531	Packaging – Complete, filled transport packages – Stability testing of unit loads
ISO 11683	Packaging – Tactile danger warnings-Requirements
ISO 12048	Packaging–Complete, filled transport packages – Compression and stacking tests using a compression tester

Table 8. ISO 9000 Series Quality System Models

ISO 9001	Quality Systems - Model for quality assurance in design/ development, production, installation and servicing
ISO 9002	Quality Systems - Model for quality assurance in design/ development, production, installation and servicing
ISO 9003	Quality Systems - Model for quality assurance in final inspection and test

Table 9. ISO 9000 Series Guidelines

ISO 9000-1	Quality management and quality assurance standards – Part 1 : Guideliness for selection and use.
ISO 9000-2	Quality management and quality assurance standards – Part 2 : Generic guidelines for application of ISO 9001, ISO 9002 and ISO 9003
ISO 9000-3	Quality management and quality assurance standards – Part 3 : Guidelines for the application of ISO 9001 to the development, supply and maintenance of software.
ISO 9000-4	Quality management and quality assurance standards – Part 4 : Application to dependability program management
ISO 9004-1	Quality management and quality system elements – Part 1 : Guidelines
ISO 9004-2	Quality management and quality system elements – Part 2 : Guidelines for services
ISO 9004-3	Quality management and quality system elements – Part 3 : Guideliness for processed materials
ISO 9004-4	Quality management and quality system elements – Part 4 : Guidelines for quality improvement

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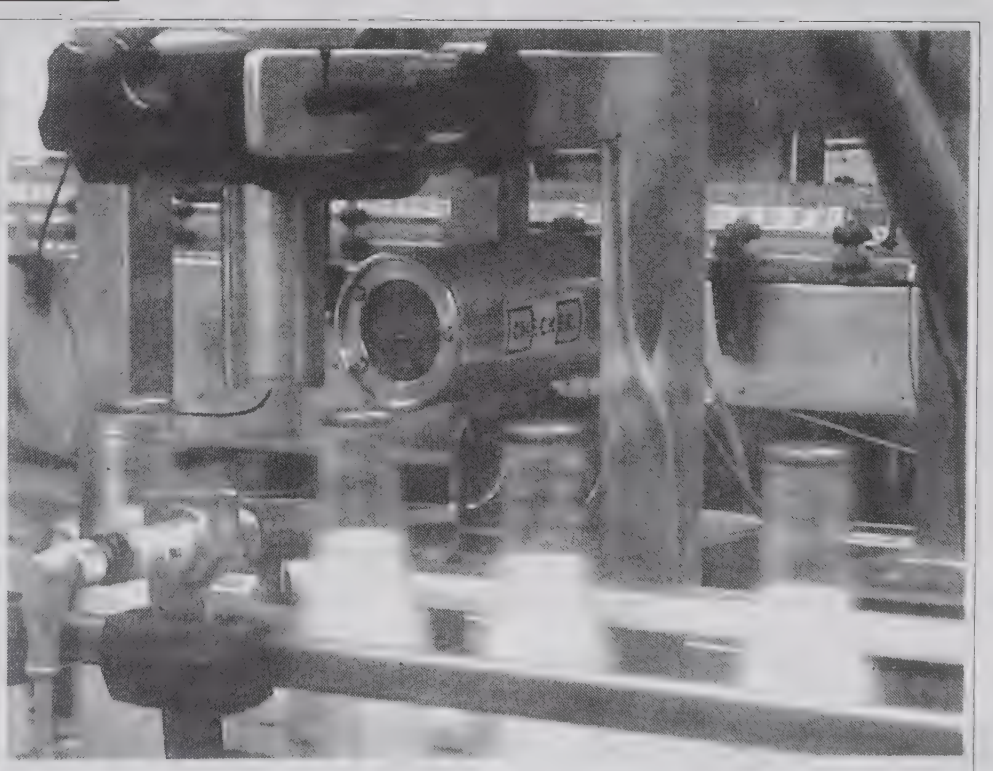

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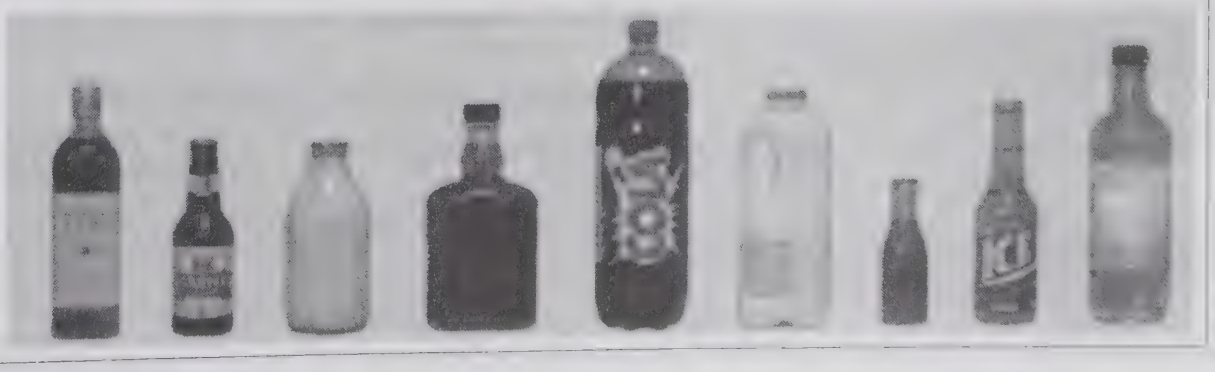

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Large Volume Food Packaging

by
R. Jagannathan*, B. Tech.

Foodstuffs and their packagings

Foodstuffs & their Packaging must ensure 'Food Safety'. Food safety is an essential requirement, even if not explicitly expressed by the consumer. Legally, it is defined by the obligation that neither the product nor the package should contain: 1) Contaminants of microbial origin capable of affecting the consumer's health; 2) Contaminants of chemical origin & 3) Contaminants of physical origin (foreign bodies). Farm produce industries have to use raw materials that are perishable and have only a limited life. Following formulation, manufacturing processes must bring foods to a stable state, which packaging techniques must preserve throughout the distribution system and essentially until the consumption of the food.

Quality requirement for larger packages

The package must supplement the protection provided by any pre-packing; provide protection during storage and transportation and keep the products closely packed together, without applying any additional stresses.

Packaging material of good quality is essential for automated 'setting-up and closing' operations. 'Setting up and closing' operations should not be weak points that can render good food material useless. We should closely observe dimensional tolerances with regard to use of pallet or pack surface areas and volumes, when grouping and palletising and when consolidating loads of food packages for exports / for local transportation.

The package must be capable of withstanding the loads to which it is subjected in storage, which implies that:- a) it must withstand the maximum load that may be encountered in the distribution network and b) a clear indication is given as to the height to which the packed products may be stacked under the most unfavourable climatic conditions / for stuffing inside the container without much difficulty and at the same time, occupying the maximum possible volume. (See the diagrams of Pallets for different foodstuffs and such pallets stacked one above the other. The LLDPE Stretch Film wrapped over the pallets, will safeguard the food products from the unfavourable climatic conditions during transport and storage.)

The package should therefore be tailored to meet the most demanding climatic conditions, in terms of humidity and temperature. Packages, whether or not grouped into pallet loads, should be capable of withstanding impacts, drops and punctures, to minimize the risk that the quality of the product contained in them is impaired. Stretch Wrapping the pallets using LLDPE stretch cling Film, after 300% stretching of the film, will certainly hold the packaging intact and withstand impacts, drops and punctures, without impairing the quality of the products.

The package is a medium for conveying information of all kinds, displayed either through printing or by affixing labels. The surface state of the package must be suitable for these operations; logo, graphic presentation, brand name and quantity must all be legible and meet the demands encountered throughout the distribution chain. Stretch Wrapping using LLDPE Stretch Cling Film will meet these requirements also.

The package must have features permitting easy-opening; facilitate supplementary operations (price marking, for example); continue to contain the products satisfactorily once opened; not be hazardous to open; be of a size compatible with the shelf display fixtures.

The aspect of packaging is becoming increasingly important; it enters in cost evaluation and it is a significant component of quality. Multi-unit and shipping packages must be easy to dispose of, because they do not normally reach the end consumer, and their disposal is the task of the retail sales outlets. Pallet Stretch Wrapping, using LLDPE stretch cling film, after 300% stretching, is one such method, which meets these requirements. The options for disposal or collection for recycling purposes should be examined closely, since appreciable savings in materials can be achieved by recycling at national level.

Regulatory Provisions.

Protection of Industrial property:-

a) Patents: Many packaging property rights are granted in industrialized countries, either as a patent (period of validity - 18 to 20 years) or as a certificate of registered use (period of validity - 6 years). The acquisition of equipment or of a process should be accompanied by a guarantee of non-infringement of existing patents, since otherwise they might serve as a reason for objecting to trade in the goods concerned.

b) Design: The same consideration applies to package types, especially for prestigious products; the period of validity of a registered design or pattern is usually 25 years, renewable for the same period.

c) Brand names: The period of validity of a registered brand name in regular use is 10 years, renewable indefinitely. It should be noted that some courts recognize the validity of unregistered brand names.

Weights & Measures:

The Codex Alimentariusa and the United Nations Economic Commission for Europe (ECE) have standardised the main quantity ranges used for most pre-packaged foods, and for the transport of fruit and vegetables. A series of EU directives lays down package sampling and control methods and sets out the permitted tolerances as regards capacity.

Within the EU, enterprises that follow the control procedures laid down for package capacity and also for filling lines are authorised, under certain conditions, to mark their packages with a sign (an inverted epsilon for the package; "e" for pre-packed products).

Selecting a package

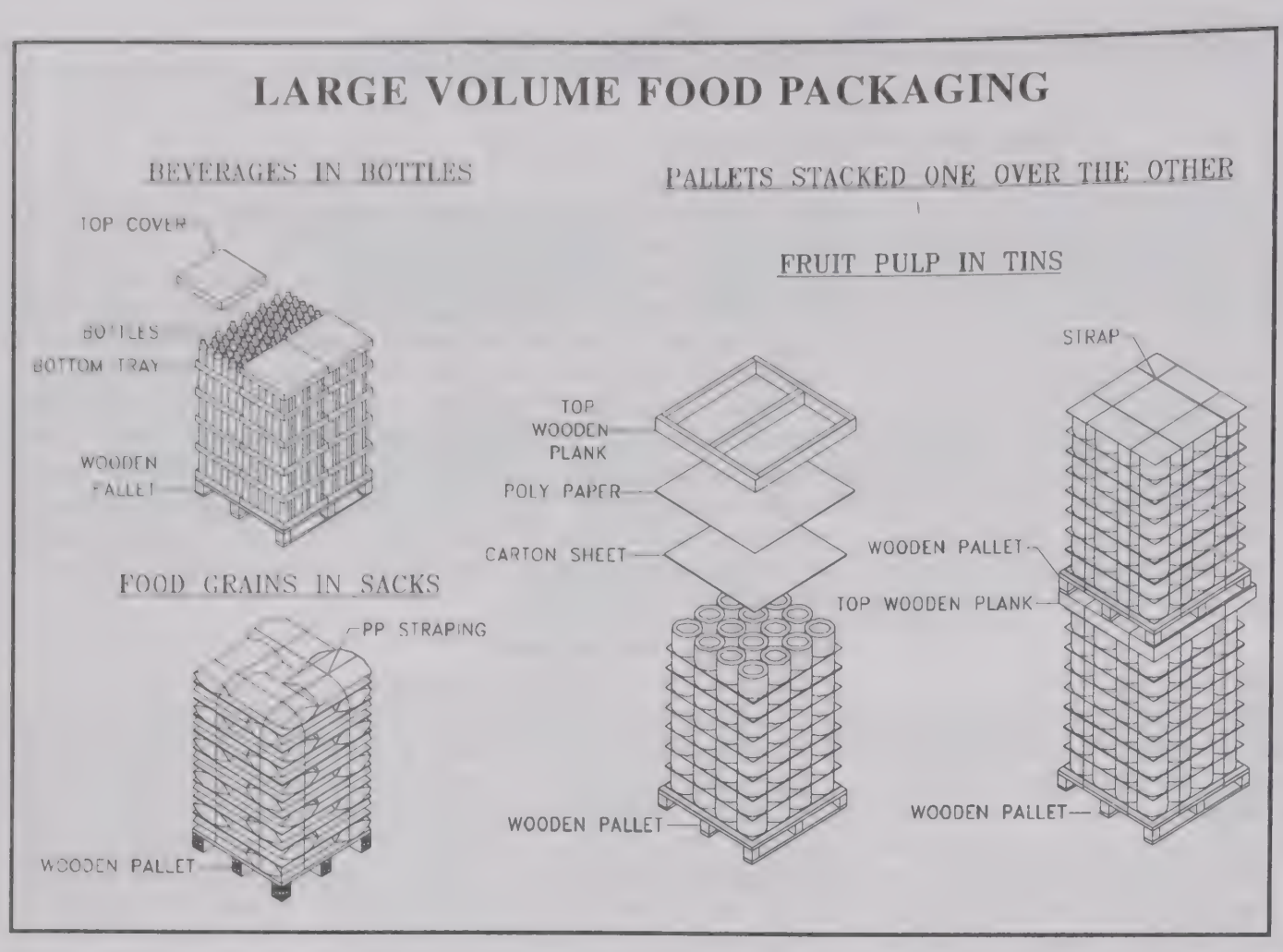
The following four main sets of criteria must be considered in choosing a package:

- Economic, technical and regulatory criteria;
- Marketing criteria: price, quantity, presentation, etc.;
- Suitability of the package for the product being packaged;
- Distribution criteria.

Selecting the most suitable packaging is important both to packaging manufacturers and to food packers. Foods are considered here to be:

- Staple foods and other nutrients, such as fruits, vegetables, sugar, cereals, etc., in the natural state, chilled or freeze-dried;
- Food additives of natural origin (spices, some sweetening and colouring agents) or chemical origin;
- Prepared foods, such as canned foods, frozen foods, beverages, chocolates, etc., delivered either in transport packages or pre-packed for retail sale.

* *Director - Marketing, Penguin Engineers, 46-B, KRK Road, Krishnasamy Nagar II Layout, Ramanathapuram, Coimbatore - 641045.*



We should conduct several series of tests on samples using the criteria set out below before choosing a new package.

- Compatibility of container and contents: This concerns in the main, the preservation of the organoleptic properties of the food; the absence of oxidation, weight loss, and loss of flavour.
- Migration: This essentially concerns overall migration into a product sample, simulating the product to be packed.
- Conservation of the food: Determination of the optimum achievable shelf-life of the packaged product.
- Durability of the pack-age: Appearance, feel, fastness of inks, delamination, etc.
- Fit of the container aperture and its closure: Diameter tolerances, absence of minor leaks.
- Weights and Measures: Weight, thickness, capacity of the package.
- Physical properties of the package: Absense of micro-porocity, quality of sealing, odour, permeability, mechanical strength, etc.

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2) Indian Institute of Packaging, Packaging of Food Products, Bombay, 1986.

3) Davies, J. - Food Contact Safety of Packaging Materials 1990-1995, 2nd edition, Leatherhead, PIRA International, 1996.

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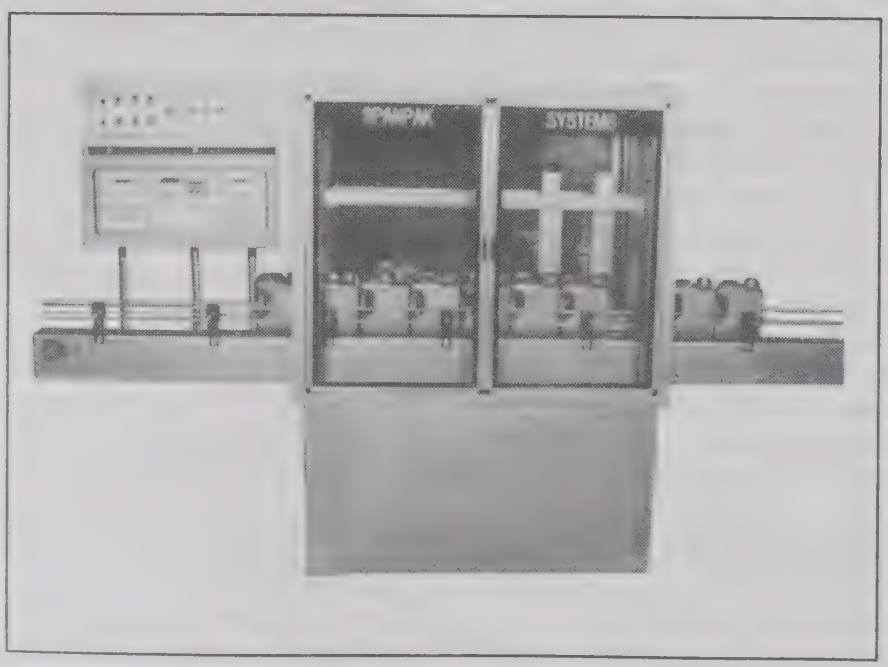

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New Aseptic Beverage Filling Technology

Aseptic Beverage Filling — Programmed for growth

New beverage products and innovative packaging confront filling technology with increasing specific requirements. The challenge is high efficiency coupled with maximum microbiological safety for trend-centred products. Very often the solution is aseptic filling, one of many innovative solutions within the field of filling and packaging technology.

The major food industry trends such as convenience, wellness, freshness and consumption are playing an increasing role in consumers' purchasing behaviour when buying drinks and juices. Especially in highly developed markets like Germany, the consumer expects a certain "extra benefit", i.e. more "freshness" and "natural qualities" with regard to the product and more additional benefits as far as packaging is concerned. Traditional packaging solutions are often insufficient. Glass is too heavy and breakable. The known procedures for ensuring microbiological safety such as hot filling or the addition of preservatives do not comply with consumers' requirements for freshness and natural quality. Aseptic filling is the unifying technology which bridges the gap between the two different requirements, which so far have been difficult to unite.

The pioneer sector for aseptic packaging was the drinks carton packaging sector. Rough estimates show that between 130 to 135 billion carton units are being used, of which approximately 53 to 55 percent are aseptic packaging. The share of aseptic packaging continues to grow and may be symbolised by three letters: PET. In contrast to carton packaging, PET packaging enables the aseptic filling of fizzy drinks.

To achieve a successful aseptic PET filling, specific conditions and requirements have to be fulfilled by machine and process technology, such as, for example, effective i.e. germ free, processing of the bottles, caps and last but not least the product itself. Quick heating is a well known procedure for handling the product, it works gently on the product and allows simple heat recycling. Newly moulded bottles as well as any pre-used bottles are transported to the aseptic area by means of an "air transport device". As part of the first step, the bottles are disinfected by applying disinfectant and steam to the inside and outside of the bottle and then channelling the bottle through a rinsing procedure. Another procedure directly transports the bottle to a rinse unit. Inside the rinse unit the bottle runs through various stages of disinfection, rinsing, dry blowing and drip-drying. A fairly new process is the use of ionised air as a rinse medium. To ensure the use of the appropriate rinse media, special sterile water and air units are required.

After the rinsing procedure, the bottle is passed to the filling and lid-closing areas. The preferred filling process for aseptic filling is volume filling. The filling and capping devices have a special, hygienic design. Any materials used and handled are also chosen in consideration of their hygienic characteristics. The transport of the bottle caps to the sealing unit is a further important point. This part must also be germ-free. To ensure this, a dip-bath stage is applied, which contains a disinfectant into which the seal cap is dipped. After the bottle has been sealed, the filled bottle is again passed through a further aseptic area.

Aseptic valves and an automated CIP/SIP system for the entire sterile area and the internal and external surfaces are required for aseptic filling. In addition, an appropriate clean-room system is required to safely separate the sterile area from the outside world. In most cases the separated clean-room area is filled with overpressured sterile air to create a forced airflow exiting the sterile area. The design of the clean-room depends very much on the design of the individual manufacturer.

There are advantages with every system – from the machine casing to a complete clean-room.

However, the critical point is not the clean-room, but the bottle and cap, etc., supply devices. The real manufacturer know-how is represented in the design of these sluice-devices and it is this which principally determines the level of microbiological safety. A second crucial factor is obviously the reliability of the plant, as the hygienic protection of any clean-room is challenged when the operating staff has to step into this area.

Admittedly, the cold sterile filling procedure is not simple technology, however, it is controllable and enables beverage manufacturers to serve the growing market segments. Therefore, it is clear that PET and cold sterile filling are programmed for growth.

Flexible Retail Packaging for current trends

The packaging preferred by the drinks market consumer often depends on the event the drinks are bought for. An evening spent watching a football match often requires a large crate. A six-pack may be sufficient for home consumption and when taking a weekend ramble through the countryside a packet of three might be satisfactory. The right packaging solution for the beverage industry must therefore be flexible and product specific.

The right container in the desired packaging designed for the corresponding market requirements – that is the requirement of many beverage producers in these times of targeted consumer marketing. However, even once these factors have been established there is a lot of work still to be done before the product appears on the shelf. The bottle or can must be packaged by special packaging machines and there is a vast number of different packaging machines available: for wrap-around packaging, shrink tray packaging, shrink packaging, pad packaging combined with a tray and wrap-around packaging.....

Multi-unit carton packaging machines take a certain amount of bottles, glasses and cans and create well-known and easy to carry retail units. Depending on requirements, they wrap, in a continuous process, anything from two to twenty units into a ready-cut box design.

Using shrink foil packaging machines this is achieved by packaging retail packages with PVC foil. The machine assembles the bottles or cans in the required packaging formation, wraps them with shrink foil and then channels this packaging set-up through a shrinking tunnel, where hot air shrinks the foil. Depending on your requirements this type of packaging can also be combined with the use of pads or trays. A wonderful world of variety! However, variety means a need for flexibility, which also applies to the next step of packaging: i.e. preparing pallets or co-ordinating a transport unit. The use of robots, already common in car manufacturing, can also be applied to packing pallets. Within a certain operational area the robot can precisely reach any point to pick-up or put down product. A robot is easily integrated within a larger operational set-up and will handle crates, cartons, trays, barrels or other individual containers with the utmost precision. The ability to position and repeat processes within a tolerance of a few millimetres is another good reason to recommend the use of robots.

The robot fulfils these tasks by using special pick-up tools. The packaging of different brands onto various pallets is also possible, whereby the various packaged brands use a single conveyor belt and are identified and sorted by barcode. The robot will then fill the corresponding product pallet with the appropriate product.

Any returnable containers that go to the consumer will be returned to the manufacturer at some stage. However these containers are not always returned with the required separation. To unload these returnable bottles etc., which are often packed on pallets in a chaotic fashion, requires a slightly more sophisticated logistical process that can also be eased by using robots. A precision laser identification system enables exact definition of position and orientation in a given area, which enables the exact sorting of often mixed pallets with returnable bottles etc.

Packaging which addresses the consumer's needs and those of the target groups will, in future, gain increasing importance. However, such a variety of packaging will require machinery and technology that is precisely designed to meet these requirements. The use of flexible packaging machines and robots represents the right packaging tools for the job.

In future, the filling and packing process could be separated. At least that is what a certain model suggests. Separation would mean a more effective procedure within the wet procedure. The filled product would go into interim storage and then be packaged in accordance with requirements.

Labelling PET bottles

Everybody is talking about PET bottles, many are considering them and many drink distributors already have them in their standard product programme. But only a suitable coat will give the heavily discussed bottle the necessary marketing weight. A well-placed label, designed to give the appropriate brand message is therefore a must for the brand distributor and exact labelling has become a very important factor within the framework of all-inclusive marketing concepts. Obviously, labelling exactness cannot be left to chance but requires the best machine and plant technology.

Roll-Fed-Technology

The very latest and most up to date technology for labelling PET bottles is almost certainly roll-fed labelling, and the so-called roll-fed technology, allows the use of PVC materials and labelling paper. This guarantees a high degree of flexibility in the use of labelling materials. The labelling procedure works as follows: the labels take the form of an endless roll of material. Various guide rolls channel the material to the labelling station. After the label has been cut as required, it is hot glued to the bottle via a vacuum drum. Start and end of label gluing is used for the disposable PET bottles programme. If this procedure is chosen for PET returnable bottles, the initial gluing should be omitted. The gluing of the label onto the bottle is done by a static charge or a moist film. The final gluing is applied to the overlapping side of the label. This enables easy removal of the label when the bottles are returned.

A great advantage of roll-fed technology lies in the labelling of formed vessels. Besides traditional bottle shapes, individually shaped vessels can be easily processed. The latest machinery developments place emphasis on more convenience and the fast exchange of format parts which also offers savings. A newly developed labelling machine that was demonstrated recently, enabled transport of the label directly from the roll to the vacuum cylinder which also simultaneously took the role of cutter unit. The cutting is handled by the vacuum drum, which removes the need for use of a previously installed cutting drum.

Paper Labelling from Sheets

A further method of labelling PET bottles etc., is paper labelling from sheets. Both hot and cold gluing can be used. Hot-glue labelling is more economical, since the label is only glued at the start and end of label. The cold gluing technique is a labelling technique which involves the label being fully glued on. When labelling returnable PET bottles, it makes more sense to use the cold gluing technique since cold glued labels can be removed more easily by common cleaning equipment.

The processing of individual labels with the hot glue method is principally comparable with the roll-fed labelling process. The main difference is the actual feeding of labels from a magazine instead of a roll. With the cold gluing process, the labels are taken from a label magazine and are channelled through a gluing segment, which has already applied glue from a gluing roller. The gluing segment runs along a pick-up drum. The pick-up drum picks up the label with special pincers from the gluing segment and applies the glued side of the label to the vessel.

All labelling techniques, i.e. roll-fed, hot glue and cold glue labelling, allow the processing of low and high volume label output.

Sticky Labels

The same applies to sticky labels, which are still only rarely used in the beverage industry. The reason for this hesitant use is the fairly high cost in comparison with any of the techniques already described. High volume labelling using this method is not undertaken for reasons of cost. With regards to equipment and machinery set-up, this method offers remarkable cost savings on the equipment side, since certain form parts for different label sizes can be omitted. To date, the sticky label method has only been used for labelling high value spirits in glass bottles.

The sticky label process uses fully pre-glued labels. Even if individual labels may have different stick-on characteristics, sticky labels are exclusively used on PET bottles.

Sticky labels may be made from paper or transparent foil. The often quoted "no label look" can be achieved by using transparent sticky labels. From a marketing point of view this can be a very interesting choice, as it gives the appearance of a bottle with print directly applied.

As with roll-fed labelling, the labels are fed to a feeder via guides. A final and very sharp change of direction removes the label from the conveyor and applies it to the bottle.

The advantage of using the sticky label process lies in the problem-free application of the labels. For higher volume output, up to six labelling stations can be installed. When using roll-fed or sheet labelling further labelling stations can be installed by integrating glue or sticky label stations with the basic machine.

Summary

There is a variety of Labelling options for PET bottles. When looking for the approapriate labelling method ask yourself whether you want to label single-use or returnable PET bottles. Do you want to label traditional bottle shapes or differently shaped bottles? How efficient is the labelling method? How many labels are to the applied on one bottle? A visit to Drinktec-Interbrau could provide you the answers.

Excerpts from press release of the forthcoming Drinktec-Interbrau 2001 Exhibition to be held in Munich from Sept. 20th - 27th, 2001

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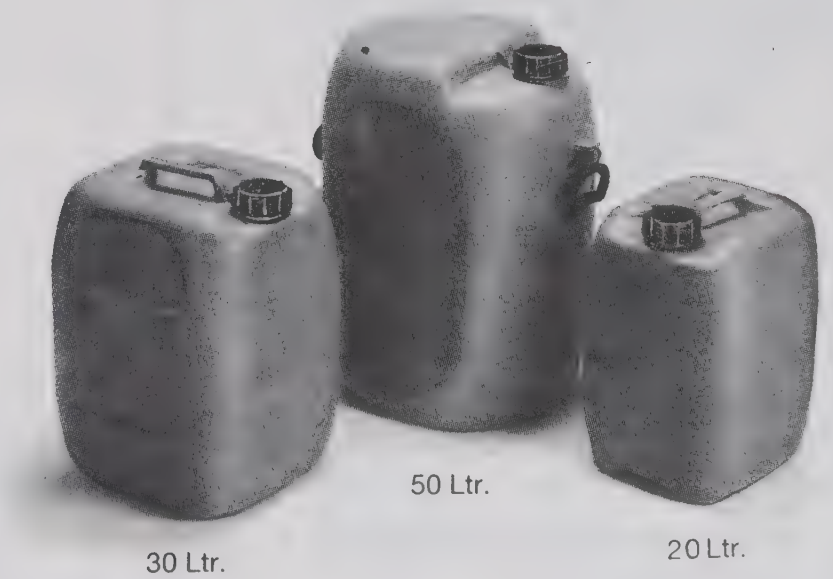

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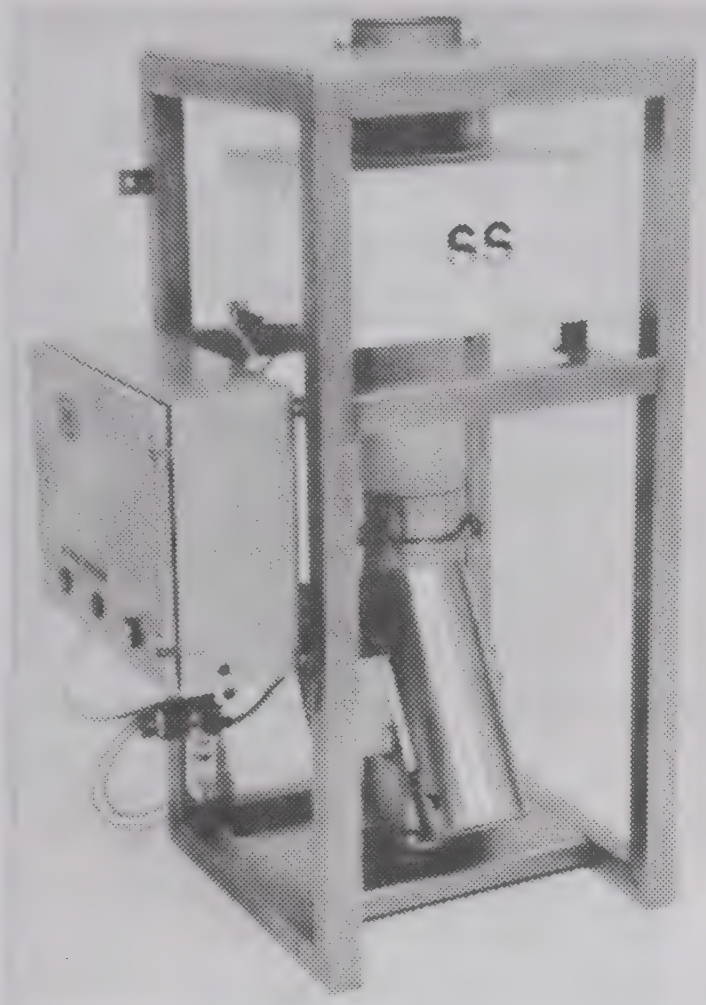

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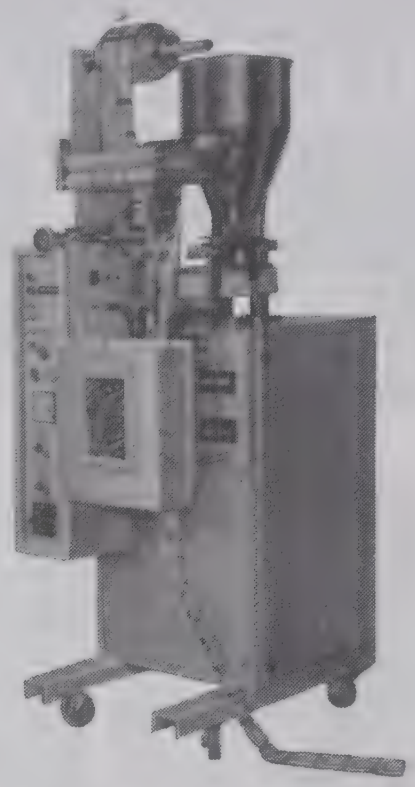

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Packaging Materials for Food Industry Properties and Designs

by
Moitreyee

Introduction

The traditional concept of packaging material as a protective medium has undergone a change and more features are now attached to a package. It has now become a resource, utility and facilitator in the overall distribution and marketing of a product. With the consumer awareness combined with rapidly changing lifestyle creating a demand for processed and convenience food products as well as preference for unit packs, the importance of packaging in food industry has reached great heights. The total consumption of packaging material in Indian processed food industry has shot up from 2 million tonnes in 1994-95 to 4 million tonnes in 1999-2000. Sixty five per cent of total packaging material in India is used for food packaging. In food industry, cost of packaging contributes 12-20 % of the final product cost. Quality, cost effectiveness and functional attributes of packaging material is becoming more and more significant for our food industry. In this context, we would like to discuss some interesting features of different packaging materials, in relation to their properties and designs.

Corrugated Board Box (CBX):

In the late nineteenth century (1871), Albert Jones discovered an ingenious way of giving strength to paper. He took a piece of paper, converted it into a series of flutings, by moistening it and passing between two hot corrugating rolls. This discovery, which he went on to patent later, is now called Corrugated Board, so called because of the 'corrugations' or 'flutings' that characterize it from other kinds of board. Today, Corrugated Boxes are everywhere. This simple yet profound packaging medium is now ubiquitous, having emerged as the largest transport packaging material.

The structure of a 3-ply Corrugated Board is, Kraft paper liner - Adhesive - Fluted kraft paper - Adhesive - Kraft paper liner. For designing a CBX, first we have to consider the box strength requirement, which is influenced by the following factors:

- ✓ Protection requirement of the product (load bearing or non load bearing)
- ✓ Product shape, size and weight
- ✓ Distribution hazards
- ✓ Total journey time and storage conditions

The strength of a CBX depends on:

✓ **Paper quality:** Depending on the source, paper is classified in two types: Virgin (from agro based raw materials, e.g. bamboo, rice husk etc.) and Recycled (from paper, garbage, waste etc.). Paper quality also depends on the country of origin. In tropical countries like India, woods are hard and contain short fibers. But in cold countries, paper made from soft woods contains long fibers. Long fibers give strength and flexibility, which helps the paper to withstand tearing and bursting. Whereas, short fibers provides stiffness, opacity and smoothness.

✓ **Gradation of paper:** Depending on the Burst Factor (BF) paper is classified as: A-grade (BF +25), B-grade (BF 15-22) and C-grade (BF <15). BF is mathematically defined as, BF = (BS x 1000) / GSM; Where, BS = Bursting Strength (in kg/cm2), i.e. the resistance put up by a circular sheet of paper to rupture when pressure is applied; and GSM = Gram per square meter, i.e. the mass of unit area of the paper.

Generally in a box, BS of flute paper is 50% of plain paper and GSM of flute paper is 1.5 times of plain paper.

✓ **Number of plies:** Depending on the number of fluting and kraft paper liner the box may be made of 3-ply, 5ply or 7-ply.

✓ **Moisture content of paper:** 7-8% is ideal, higher the moisture content the poorer will be the strength. But, too low moisture makes the board brittle.

✓ **Adhesive:** Mainly two kinds of adhesive are used:-
Starch based, which is neutral, slow drying, light and does not cause smudging of print on the outer surface.
- Sodium silicate based, which is alkaline, fast drying, heavy and affects printing when oozes out on outer surface. Gluing can be done either on entire paper or by tip gluing.

✓ **Fluting:** Corrugation provides strength and cushioning. Fluting is a low-density core forming the load bearing area of the box. The broader the flute the better the cushioning and resistance to bending. The narrower the flute the better the resistance to flat crush, as the column is supported at more number of points. Number of flutes per unit length influences the cushioning property; more the number of flutes, more is the cushioning property. Crushed flutes reduce the compression strength of a box. Different types of flutes may be used in combination to obtain optimum properties of box. According to IS : 2771, flutes can be classified as:

Type	Avg. height (mm)	Avg. no. of flutes per 30 cm
A flute - Broad	4.5	36
B flute - Narrow	2.5	52
C flute - Medium	3.5	42
E - flute - Micro	1.0	90
J flute - Jumbo	7.0	20
F flute	0.75	125

✓ **Box design:** The BIS standard for corrugated box (IS : 2771) can be used as a guideline for box designing. Depending upon the nature of contents and the journey intended, this could be modified to achieve economies. The weight carrying capacity and strength requirements as per the standard are given in the Table 1.

Table 1
Weight carrying capacity and strength requirements as per IS: 2771

Types case	Wt. of box & contents, max, kg	Combined internal dimensions (L+W+D), max*, cm	BS of board, min, kg
3-ply	10	100	8
3-ply	20	150	12
3-ply	30	200	14
3-ply	40	225	19
3-ply	55	250	24
5-ply	20	150	12
5-ply	30	190	14
7-ply	40	225	19
7-ply	55	250	24

*For each 10% reduction, in the weight of the box and contents below the maximum permitted for a box, the combined internal dimensions shown in the table may be increased by 5%

Sr. Executive (Quality Assurance), GCMMF, Anand. Cont. Add: D-82, NDDB Campus, Anand, Gujarat. PIN - 388001.

Flexible Laminates:
With the development of new films, packaging machines and processing techniques, laminates have been exploited to a greater degree than ever before and the branded unit pack is becoming the rule in the marketing of food products. Packaging cost could be reduced by 50% or more if flexible laminates are used as opposed to traditional materials like metals and glass, even though the unit size in the flexible pouch will be less.

As a single layer film is not adequate to perform all the functions of a package, a flexible laminate consists of super imposed layers of plastics, paper or foil bonded together by heat or adhesive or polymer melt to form a complete film of uniform thickness and flexibility. A laminate is defined flexible when substantial parts of it can be folded to 180° without cracking and without the need of pre-crease.

Some salient points of the main three types of laminates used in the food industry are discussed below:

✓ **Coextruded films:**
- Several layers of plastics extruded at once
- Adhesive or tie layers used to promote bonding between adjacent layers
- Special feed block to provide proper relative thickness of layers
- Improved barrier properties
- Provides slip/stiffness for better machinability
- Provides heat sealable surface to films
- Typical coextruded films have 3-7 layers

✓ **Adhesive laminates:**
- Two or more layers of materials bonded with an adhesive
- Used where a non-polymer component is required, for special properties or low cost, for e.g. Al foil or paper
- One surface is printed and then covered by a protective layer preventing oils or abrasion to detract print quality

✓ **Coated films:**
- Melt extrusion of a polymer on base film
- Applying solution or dispersions of polymers to base film
- Improves heat sealability, barrier properties, machinability etc.

For designing the composition of a laminate, following properties of the polymers have to be considered:

✓ **Tensile strength:** It indicates the resistance to stress. So it helps to determine the amount of plastic needed to form the wall of a package, thus affects the cost of package.

✓ **Tear strength:** There are two kinds of tear strength, notched and unnotched tear. Some polymers have excellent unnotched tear but poor notched tear strength, which can be an advantage in designing packages, which needs easy openability.

✓ **Impact strength:** It indicates resistance to rupture when subjected to sudden stress. It is measured by dart impact test.

✓ **Flex life:** Flex life means the number of flexing cycles that a film can endure before failing. It becomes important where film package is flexed in service or where oxygen or water vapour penetrates through pinholes, developed by flexing, damages the content.

✓ **Water Vapour Transmission Rate (WVTR):** It is important for packaging moisture sensitive foods. WVTR is inversely proportional to film thickness and increases with both temperature and relative humidity (RH). It is expressed as g of water vapour / unit time / unit thickness / unit area at a temperature of 25 or 30°C and RH of 90%.

✓ **Oxygen Transmission Rate (OTR):** OTR is important for oxygen sensitive foods. It is affected by humidity. Unit is volume of O_2 transmitted / unit area / unit thickness / unit time at specified O_2 pressure, temperature and RH.

✓ **Optical properties:** This is important for light sensitive food products. Polymerization conditions affect the optical properties of a polymer.
- Gloss: Ability of film to reflect incident light, gives sparkling appearance
- Haze: Milkiness caused by scattered light due to imperfections on surface or film inhomogenities by large crystallites, voids, incompletely dissolved additives, cross linking etc.
- Light transmittance: Film transparency

✓ **Heat seal properties:** Affects the strength of seal and 'hot tack' in form fill seal machines.

✓ **Bonding strength:** It resists delamination of films.

Different properties of some common packaging polymers, have been shown in Table 2.

Table 2
Properties of some common packaging polymers: (Average data based on one mil film)

Type	Density (g/cc)	Tensile strength (kpsi)	Tear strength (g/mil)	WVTR (g/100in2. day)	O_2 permeability *(cc/100in2. day.atm)**
HDPE	0.956	4.25	275	0.40	150.000
LDPE	0.918	3.25	150	1.50	500.000
LLDPE	0.921	5.50	525	1.50	525.000
EVA	0.930	2.50	120	2.50	800.000
BOPP	0.900	25.00	340	0.40	130.000
PET	1.400	29.00	60	1.25	45.000
PVC	1.290	6.00	550	16.00	315.000
PVDC	1.650	12.00	50	0.18	0.550
EVOH	1.170	1.45	500	4.50	0.015

* at 100° F and 90% RH
** at 77° F and 0% RH

Metallized Films:
Metallized film is a typical flexible laminate, where one component is aluminium. For manufacturing, rolls of film are unwound in a vacuum chamber and exposed to a vapour of aluminium metal which deposits as a very thin layer on film. Nowadays, SiOx coated metallized film has been developed, having following advantages:
- Pass metal detector
- Lower GSM
- Similar barrier properties
- Excellent aroma barrier, useful for packaging of spices

Advantages of Metallized films over Foil laminates:
- Lower GSM, hence Cost effective
- Improved flex resistance
- Similar barrier properties

Shrink Wrap Films:
Shrink-wrapping is defined as packing an article or a group of articles with a thermoplastic film which when subjected to heat, shrinks and forms a tight wrap around the object. So it has four steps : wrapping, heat sealing, shrinking and cooling.

✓ **Principle:** All polymeric materials consist of large macro-molecules linked together with macro-molecular force of attraction. These forces disappear when the material is subjected to mechanical stress or heat and reappear with the release of these stresses.

✓ **Manufacture:** While manufacturing of film by blown film techniques, a large cylinder of film is extruded from a circular die to create a bubble. The bubble is inflated by pressurizing the air inside the bubble. Then the film is

stretched both in the machine as well as in transverse direction, leading to uncurling of macromolecules. Rapid cooling freezes this oriented state of macromolecules. When reheated, frozen forces are released and the macromolecules return to a lower energy level resulting in shrinkage of film.

✓ **Materials for Shrink-wrapping:** LDPE, PVC, PP, EVA etc. LDPE is most widely used due to its easy processability, good strength, contact clarity, good barrier property and low cost.

✓ **Advantages of shrink wrapping:**

- Contour fit, readily conforms to odd shapes and large sizes
- Tightening eliminates looseness and wrinkles and gives neat appearance
- See through display
- Immobilization, minimizing damage
- Product identification
- Reduce labeling cost

Plastic containers:

Plastic containers are important agents for packaging foods and their use is expected to increase because:

- they are convenient and cost effective
- new or improved types are continually being developed

Mainly three types of plastic containers are used in food industry, which are described below:

✓ **Thermoformed:** This type of containers are manufactured by heating a sheet or film and then forming it into desired shapes by forcing into cool molds. In this process molds can be made quickly. It involves relatively low cost. Thermoformed plastic containers can be made from extruded sheets. This process can be used in-line with packaging operation (Horizontal Form Fill Seal machine).

✓ **Injection Molded:** For manufacturing of injection molded containers, plastic is melted by an extrusion screw and forced into a cold mold where it is shaped. Containers of more precise dimension can be manufactured using this technique. This process is used where package is too deep for suitable thermoforming. It provides improved strength and stiffness.

✓ **Blow Molded:** In this process heated parison blown with a gas and expanded into a mold where it is quickly chilled to form the desired shape. Blow molded containers have greater strength and improved barrier properties. By this method manufacturing of containers of unique shapes are possible. Blow molding is used to make large objects such as gas tanks and seats for cars.

Tin Containers:

The uniqueness of a tin container is its strength and high barrier properties. Generally, tin containers have a structure of MS Plate / Tin Coating / Lacquer. In the processed food packaging field, the tin containers made at present are three piece cans consisting of a can body with side seam (soldered or welded) and two ends made separately.

✓ **Lacquer:** For food containers, tin lacquer is the most important part as it acts as a barrier between the food product and can. Food lacquers consist of a solution of resin or a resin-drying oil complex in volatile solvents, which after application to tin plate, dried, leaving the complex as hard film on metal surface. Curing process of sheets help the lacquer to dry and adhere to metal surface.

✓ **Lacquer type classification according to IS:** 5818-1988:

a) Internal food can lacquers: Barrier coat to prevent interaction between the can and the contents, which might result in deterioration of the product
b) External food can lacquers: Reduces the risk of external corrosion
c) Decorative finishes: Enhances appearance

Thrust areas in Food Packaging:

In today's food packaging scenario, security packaging, automatic product identification and environment friendly packaging are getting tremendous importance. For designing a food package or selecting a packaging material the followings have to be taken into consideration with utmost care.

Holography:

Holograms are used on a pack to provide security from counterfeit or look alike products. 'Holo' means 'total' and 'gram' indicates 'detail'. The concept has emerged from the need to have an identification mark that is simple enough to be identified by even untrained and unsuspecting eye and yet is sophisticated enough to make it near impossible to be duplicated. Holography is a method of obtaining 3-D photographic images. In 1947, British physicist Denis Gabor discovered it. First actual production was started in

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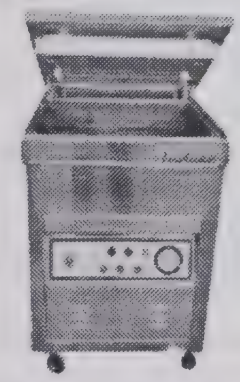
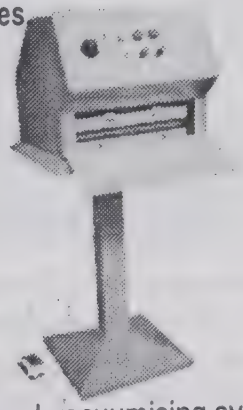


Available in Table top, Single & Double Chamber Trolley & Vertical models

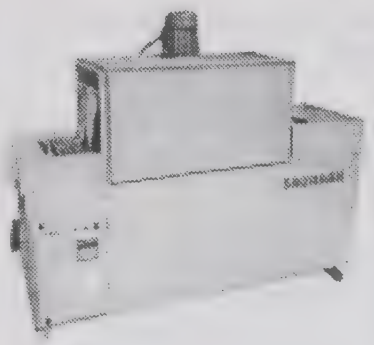
Nitrogen Flushing Machine

Pillow packing of Potato Wafer pouches



Optional vacuumising system

Shrink Wrapping Machines



Conveyorised Tunnel type models with OptionalL sealing attachment

Other Products:

- Impulse / Hotbar Sealers
- Special Pneumatic long sealers
- Continuous sealers
- Vertical sealers

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(Fact.) 2740288, 2732428
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web-site : www.indvac.com

1960, when laser became available. In late 1990s, true colour holograms have come up. Use of hologram is beneficial for the following security reasons:

- ✓ **High technology:** A recording of laser interface is generated by a split beam of laser. Then the recording undergoes development process and embossed typically on a Metallized Polyester film.
- ✓ **Easy to detect:** It has specific characteristic features for identification, viz., Hologram colour, Kinetic effect, Brightness, Form of design and Deepness.
- ✓ **Uncopyable:** Holographic technique records the amplitude and phase of the light reflected by an object completely so that it creates the real form. Colour is created by a white light spectrum splitted with prism and no ink is used. If photocopied or scanned with laser, the real object will not appear.
- ✓ **Tamper proof:** With a certain technique, the hologram can not be removed or used twice. Attempt to tamper the hologram will result in the destruction of the hologram itself.
- ✓ Not freely sold in the market.
- ✓ Multilevel security features:
- – Identification by layman
- – Identification by well trained officials
- – Identification by laboratory using tools

Bar Coding

Bar coding is a method of automated data collection. A series of block bars and light spaces identify a combination of numbers and alphabets. Laser beams scan the lines and spaces and the information is entered into the computer automatically. Each specific arrangement of bars and spaces is unique and follow strict rules and codes. This system is developed to assign a unique number to any product or service in existence. EAN (European Article numbering) - International at Belgium is the apex body for bar coding. EAN - India, New Delhi is set up by the Government of India under Ministry of Commerce to provide bar codes. There are some other coding bodies such as, UPC (Universal Product Code), which is followed in USA and Canada.

- ✓ **Bar Coding for Retail Products in India:** EAN 13: EAN - India is affiliated to EAN - International and obtains its own code from them. It is a unique 3-digit country code. EAN - India allocates another 4-digit code to each of its member organizations within the country. Then each organization allocates 5-digit number to each of its products. Thus bar coding in EAN 13 system has 12 digits plus an additional digit called check digit. This can be explained by an example:

III	IIII	IIIIII I
890	0900	14356 7

890	- Country code	0900	- Organization code
14356	- Product code	7	- Check digit

- ✓ **Bar Coding for Trade Units:** EAN 128: This is used for cases, cartons and trading units. It is a large and alphanumeric code.
  For logistic units, i.e., packages moved through transport system (trade units, pallets, containers), Serial Shipping Container Code (SSCC) is used.
- ✓ **Advantages**
- – Data entry into the computer is automatic and significantly faster than manual entry, typically less than a second
- – Scanned data is immediately available for further real-time processing
- - Manual data entry errors are reduced to zero, barcode scanned data is 100% accurate

Green Packaging

Any discussion on packaging material and package designing cannot be concluded without taking a note on Green Packaging.

Due to the exponential growth in waste generation and problem of disposal, environment friendly package is the need of the hour. According to Organization for Economic Co-operation and Development (OECD) statistics, packaging is accounted for 20.8% of all waste, 2% of gaseous emission, 1.5% of waste consumption and 3.7% of energy consumption. Solid waste management crisis in International trade is affecting packaging industry. Though each country has its own environmental rules, overall trend in developed countries is towards 3 green "R"s : Reduction, Reuse and Recycling.

- ✓ **Eco labeling Practices:** In 1991, Duales System Deutschland (DSD) has enforced Der Grüne Punkt or The Green Dot in Germany. Display of Green Dot on package indicates that the packaging material is recyclable and the manufacturer is registered with DSD. EU Directive has prescribed a few essential pictograms for reusable and recyclable packaging.

In the coming days, technological innovations, economic considerations, feasibility of reusing and acceptability of recycled material will be the major challenges for green packaging. More information regarding package/food and package/environment interaction has to be generated. To stay competitive in the market, along with all other physico-chemical and technical parameters, environmental issues have to be addressed while designing packages for food products.

Conclusion

The food industry probably is the single most industry that adopts the maximum variety of packaging media and forms. In this article, few properties of packaging materials and parameters of design for some commonly used packages have been addressed. Today, the major challenge for the food industry is to strike a balance between functions and cost in as much as the Indian market is still price driven though technology is fast catching up and market moods are moving towards value-added concepts with underlying principles and emphasis on health, hygiene, convenience and product story assurance. Both the food industry and packaging sector, by complementing and supplementing each other, have a future and a significant role to give momentum to the general economic growth.

Acknowledgement

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The views expressed in the article are those of the author.

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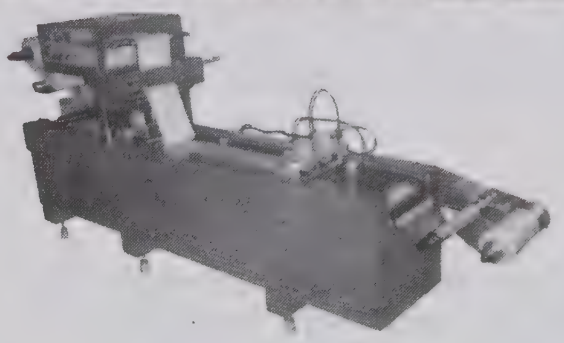

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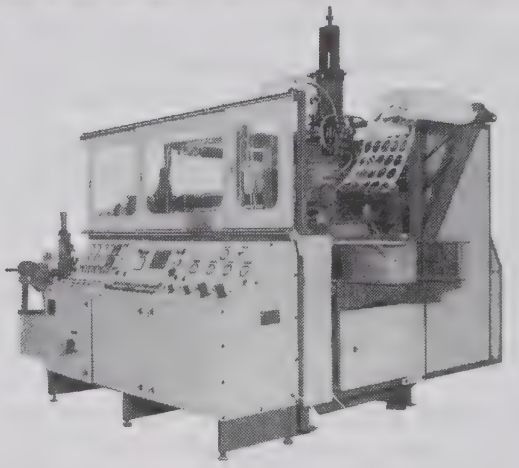

Fully Automatic Vacuum Forming Machine, for disposable Trays, Donas, Sweet Boxes, Chocolate Trays, etc.

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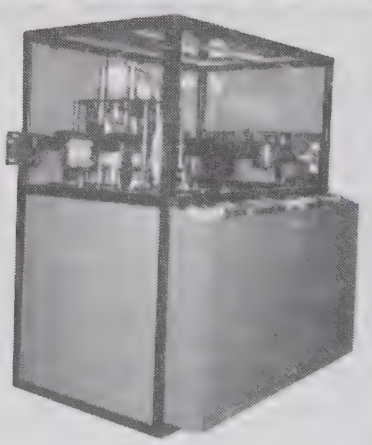

Thermo Forming Machine for disposable Tea, Coffee glasses, containers of HIPS, PP, etc.

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Low Cost Easy to Fabricate Sterile Chamber for Aseptic Packaging

by
S.G. Patwardhan

Abstract:
The author has attempted to develop a sterile chamber/ hood based on the carbon-di-oxide purge through an HDPE hood for use in aseptic packaging of vegetables. Experiments were carried out to confirm the sterility of hood and its use in aseptic transfer of corn emulsion and bittergourd, drumstick pieces in sterile pouches.

Introduction:
The review on aseptic packaging of food products brings out the need of an appropriate small scale aseptic packing unit for Indian conditions. It is pointed out that the society has the responsibility of providing jobs to rural youth. The imported aseptic packaging units cost a few crores and need huge quantity of raw materials. Development of appropriately sized aseptic packaging units near growing areas where surplus for processing is available can result in employment generation to rural youth and at the same time preserve the surplus of fruits and vegetables.

Due to increasing freight and commission to middle man, the cost of the vegetables in consumer markets in metro cities becomes exorbitant. Thus neither the consumer nor the grower benefits. The major component is lost in paying towards freight and unwanted non-edible vegetable portions like root, stem, peel, seeds, blemishes, rots, etc., which further lead to an environmental problem in metros causing a major problem.

The Don Whitley anaerobe work station costs about Rs. 14 lakhs. As a first step towards appropriate aseptic packaging unit, development of low cost easy to fabricate sterile chamber will be a very important contribution. Accordingly, experiments were undertaken to fabricate such a chamber based on the principle of use of carbon-dioxide, a heavy inert gas for the inert aseptic cover and also to ward off the contaminants by maintaining a positive flow of the gas.

Materials and Methods:
American autoclave 21 litre capacity with metal to metal joint with lid, Kipp's Apparatus, Impulse sealer, Formalin (37-41% w/v LR), Methanol for HPLC, Glacial Acetic Acid extra pure, citric acid extra pure, Calcium carbonate precipitated, corn starch edible grade, sterility media MO17, MO18 and MO13 from HiMedia, Mumbai, Bittergourd and Drumstick and Coccinia Indica (Tondli), Sugar, pH meter with gel-filled electrode, Manifold paper, Foil laminate of 15 micron polyester, 12 micron Al. foil and 150 gauge LDPE.

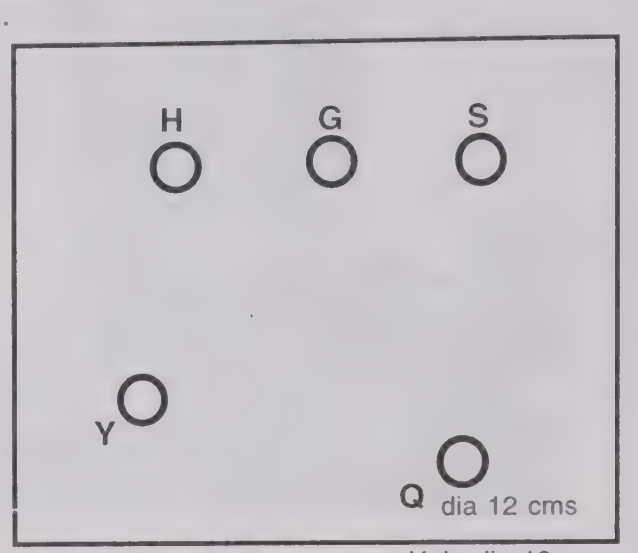
Fabrication of Sterile Chamber
Around a writing table 73.75 cm height × 112.5 cm length × 50 cm width an aluminium rod frame work was built with nuts and bolts (size 153 cm × 74 cm) A transparent HDPE extruded tube normally used as covering of roofs of huts in rainy season was obtained. The size was 176 cm × 201 cm. One side of the tube was sealed on an impulse sealer. Thus a cylindrical bag of HDPE was made. Both sides of the bag or hood were wiped with formalin 37% w/v 1:1 water mixture. The bag was pushed on the aluminium framework 153 cm × 74 cm, so that a flange of 3 inch width was formed at the rim of the hood touching the floor on all sides.

CFTRI, Regional Centre, Bhavan's Campus, Andheri (W), Mumbai 400 058

Five holes of 12 cm. diameter were cut into the front side of hood. Five HDPE hand gloves of 50 cm. length were stitched. These gloves were sealed to the HDPE hood at the five hole rims by cello tape. The hand gloves thus extended inside the hood to a length of 37.5 cm. (Fig. 2)

The outside of the gloves was sterilised with formalin and inside by methanol. When not in use, the opening of the gloves was plugged with cotton.

The position of hand gloves H, G, S, Y and Q is shown in the Fig. 1.



Position of hand gloves Hole dia 12 cms
Scale 1mm = 1cm

H and G were used for cutting open the 3% citric acid sterilised pouches by the method of Patwardhan, (1999). The acidic water from the pouches was poured in funnel K, so that it passes out to tray J.

H and G were also used for holding open pouches X and Y at the end of Z for filling the sterile corn emulsion coming from autoclave.

Y was used for passing external material like porous covered cans, presterilised empty pouches X & Y, media holding petri dishes.

Q was used to press the sealer foot paddle D for sealing operation and also for removing sealed pouches and empty cans.

Z is an alcohol sterilised rubber tube clamped on the burette stand inside the hood. The other end of Z coming out of the bottom rim of the hood was screw clamped at the position shown in the diagram 2 by legend V.

A is a rubber tube which dips inside the autoclave in the corn emulsion, the external end of which is screw clamped as L. The aluminium autoclave of 21 ltrs. capacity had a metal tube extension to the vent. The vent was removed and rubber tube fixed to it. To the metal tube inside the autoclave a glass tube was joined so that it dips into the corn emulsion. Thus the external end of the tube is a rubber tube as A.

A sterile glass funnel K attached with a previously formalin sterilised rubber tube M was kept on a tripod stand on the table.

A burette stand with clamps attached was sterilised by wetting with methanol, flamed to sterilise and later kept on the table top.

A formalin sterilised PVC tube F coming from Kipp's apparatus was clamped to the burette stand.

A pack-o-matic sealer wiped with formalin was kept on the right side of the writing table.

Production of carbondioxide – calcium carbonate was filled in the bottom chamber of Kipp's apparatus. Glacial acetic acid was poured in the Kipp's funnel little by little so that a slow carbondioxide flow is maintained through tube F inside the hood.

Sterilisation of hood from inside

Two petri dishes containing formalin 37% w/v were kept inside the hood on two sides of the table top for 24 hours. Next day they were removed using H and Y. During these 24 hours carbondioxide was not produced. However, during the removal of the petridishes after 24 hours carbondioxide purge was going on.

After 24 hours glacial acetic acid addition little by little was maintained so that the carbondioxide purge continues inside the hood for 48 hours to expel the formalin vapours. The absence of formalin was checked by smelling near the bottom rim of the hood.

Checking the Sterility of the hood

Two petri dishes containing media A, for aerobes, two petri dishes containing media B for anaerobes and two petri dishes containing fluid sabouraud medium M013, for fungus, all from HiMedia and containing 2% agar to assist in solidification, were steam sterilised in autoclave. They were then transferred inside the hood after 48 hours carbondioxide purge as described above i.e. on the third day using H and Y gloves. The covers are removed using H and G. The media containing dishes were kept in the chamber/hood for 11 days. Carbondioxide purge was maintained during this period.

No trace of formalin was perceptible before or after 11 days. If there is any entry of external air inside the hood it can be checked using an indicator for anaerobic condition based on methylene blue.

For checking the utility of the chamber for aseptic packaging of sterilised liquid food into presterilised pouches following experiment was carried out.

Sterile pouch making (Presterilised Pouches)

Preformed pouches of 13 micron polyester, 12 micron foil and 100 gauge LDPE laminate were sterilised by two methods X and Y.

X – Ten pouches of 20 cm × 20 cm were inserted into a large LDPE pouch and the larger pouch heat sealed. The larger pouch was passed through 2.5 mega gama irradiation in BARC.

Y – 3% citric acid solution in potable water was prepared in order to sterilise the inner surface of pouches 20 cm × 20 cm, they were filled with boiling hot 3% citric acid solution and heat sealed, Patwardhan (1999). These acid water filled sterilised pouches were used after 24 hrs by emptying and filling of corn emulsion and bitter gourd.

Both X and Y pouches were externally sterilised by ethyl alcohol and passed inside the hood using the hand gloves H & Y shown in the diagram No. 1.

Aseptic packaging of Liquid Food (Sterilisation of Autoclave)

In the aluminium autoclave water was poured, the tube A dipping into it. When a continuous steam stream emerged through loosened clamp L the clamp was tightened. The autoclave was sterilised.

Preparation of Corn Emulsion

Corn emulsion was prepared as follows: 100 gm. corn starch was cooked with 3 litre potable water. Sugar and citric acid was added to it to obtain 4° brix and 5.44 pH. This was passed through 16 mesh sieve. Clostridium Sp.spores 10^3 per ml was obtained from Department of Microbiology. Bhavan's College, Mumbai. 1ml. culture having 10^3 spores perml. was added to the corn emulsion.

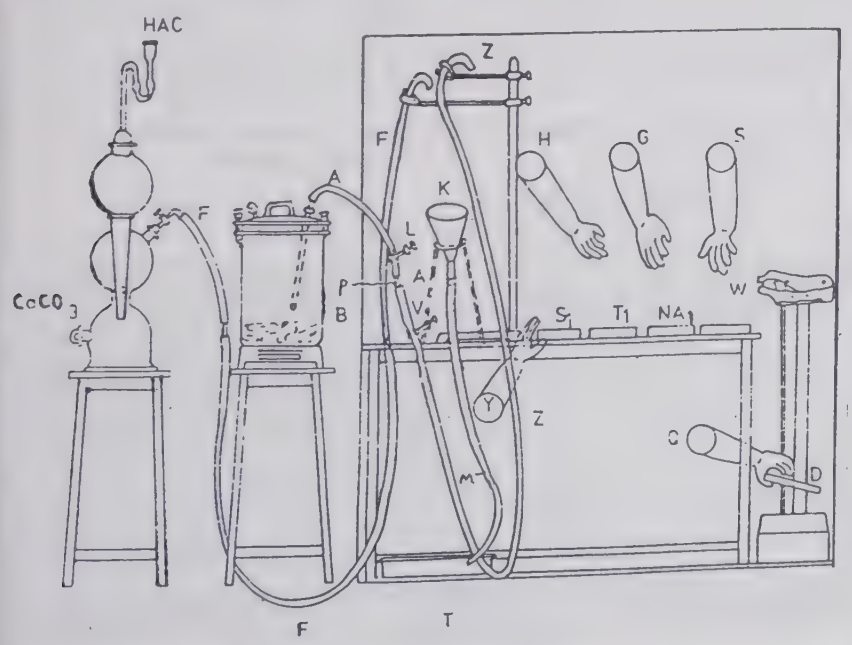
The steam sterilised autoclave was opened and 3 litre corn emulsion was poured in it.

Steam Sterilisation of Corn Emulsion

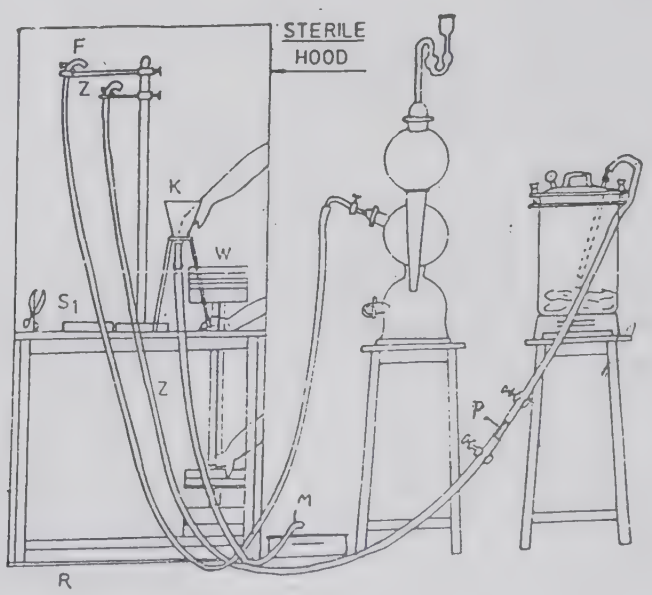
Autoclave was heated by direct gas fire. When a continuous steam stream emerged from A through loosened clamp L, the clamp was tightened. Pressure rose to 10 lb. The corn emulsion was processed for 10 minutes after which the gas fire was switched off.

Aseptic Transfer

Tube A was connected to tube Z by sterilised glass tube P when the pressure in the autoclave dropped to 5 lb. both L & V were loosened. Through the closed system corn emulsion flowed through A, P & Z inside the hood. The flow was controlled by clamps. Entire 3 litres corn emulsion was transferred into presterilised pouches 10 of X and 10 of Y inside the sterile hood and heat sealed, a little carbondioxide concluded with it. Citric acid solution in Y pouches was poured in funnel K to empty the pouches before packing corn emulsion. All operations were carried out inside the hood (Figure 2).



FRONT ELEVATION



END VIEW

Checking the Sterility of Pouched Corn Emulsion

All the 20 aseptically packed corn emulsion pouches were incubated at 37°C for one week followed by 55°C for one week. The pouches were cut opened for analysis for clostridium by MPN method and total plate count. Both were

absent in all the 20 samples.

Checking Aseptic Transfer using Sterility Media

Sterile media A, G and Fluid Sebouraud medium M013 of HiMedia were prepared and distributed 20ml. each in 8 flasks of A, 8 flasks of B and 8 flasks of the third medium of 250 ml. capacity. They were cotton plugged and sterilised at 15 lb. pressure for 20 minutes.

Karela and Drumstick was cut into very small pieces of about 1 cm. dimension. They were placed in A 2½ cans; covered with porous sheets and processed in autoclave at 10 lb. pressure for 10 minutes. The vegetable pieces were transferred inside the sterile hood into the 3 sterilised (15 lb. 20 minutes) sterility testing media in 24 flasks described earlier. The flasks were incubated at 30°C for 7 days.

Aseptic transfer of particulate food on pilot scale

A larger quantity of 12 kg. bittergourd pieces of 2 cm. size were sterilised with porous cover and aseptically transferred inside the novel hood into presterilised (2.5 mega irradiated) pouches. The operation of removal of porous cover and pouch packing i.e. the total aseptic transfer time was 90 minutes for 2 workers. Thus 10 workers can aseptically pouch 750 x 250 gms. bittergourd pieces in 8 hours. The labour may cost about Re. 1 per pouch.

Result and Discussion

For checking the sterility of the hood, sterile media meant for aerobic organisms, anaerobic organisms and for fungi were kept in open petri dishes for 11 days. No microbiological growth was noticed confirming the sterility of the hood.

Corn emulsion was sterilised in an autoclave and transferred to a point inside the novel hood using residual pressure in the autoclave and the incoming sterile corn emulsion was pouch packed inside the sterile hood. The corn emulsion pouch packed in this way, on incubation and analysis showed absence of microbial growth confirming the successful use of the novel hood for aseptic pouch packing of liquid food.

In the experiment on checking of aseptic transfer of sterile media, the three sterile media namely A, B and fluid sabouraud medium were sterilised in porous covered A2½ cans, and aseptically transferred in to glass flasks along with commercially sterilised bitter gourd and drumstick pieces. On incubation no microbial growth was noticed confirming the use of the hood for aseptic transfer work.

Experiment on aseptic transfer of bitter gourd pieces on pilot scale showed the utility of the novel hood for aseptic transfer into pouches at a labour cost of about Re. 1 per pouch. Absence of microbial growth can be taken as arrest of the growth of Cl. Sp. Using the hood Tondli (Coccinia Ind-ica) was aseptically pouch packed. The incubated Tondli pouches never showed more than 2600 CFU per ml, Pat-wardhan (1998). This paper confirms the utility of the hood.

Conclusion

It can be concluded that the novel sterile chamber/hood can be fabricated at a low cost, with ease and can be used for aseptic anerobic transfer work. This advantages is due to the use of sterile heavy gas namely carbondioxide flow. Also it can be said that the hood/chamber can be used for the manufacture of aseptically packed liquid foods like corn emulsion. Similarly it can be used for commercial aseptic packaging of vegetables like bittergourd.

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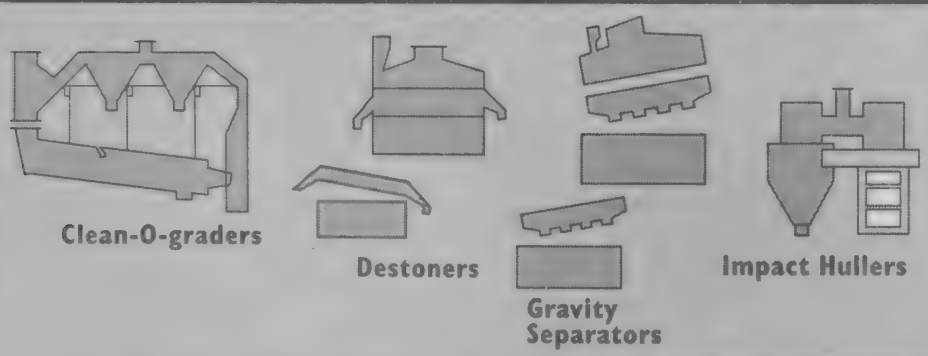

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Role of Hightech Cleaning Machineries in Agro and Food Processing Industries

by
L. D. Patel

Present condition of Agro/Food Industry

Todays consumers demand quality products and that too at competitive prices. Who can afford to neglect the quality of products in today's internationalized markets? Nobody, except those who are not serious to remain in business. Everybody in the business knows what is quality requirement for his products but some times, does not know how to produce quality with minimum dependence of human factor.

In general, Indian Industries know that many imported goods have far better quality than Indian products. They also know that these goods are processed on hightech machines, which involves minimum human control.

This article is being presented for those who are in Agro and Food Industries like, spices, grains, oil seeds, etc. It is observed that most of the industries processing the above items, employ old type of machines where labour involvement is very high. Because of this, quality suffers on account of two reasons:

a) Old type machines are not equipped with latest quality control technology for efficient separation of impurities.
b) Series of human errors and lapses are almost uncontrollable especially in Indian Industries.

Food quality specifications

For any agro or food industries, the end user of the food products is the deciding factor. If consumer target is India, then Indian Standards for quality of spices, specified by Spice Board of India, is the criteria. If a spice industry targets international consumers, then ASTA specifications for U.S.A. or similar specifications of quality for other countries becomes the criteria. It is found that quality specifications for export markets especially to U.S.A. and European countries are more stringent than Indian and Middle East markets. Similar specifications exist for other food products also.

For this reason, the cleaning machines of old design are just good enough to produce foods for Indian markets of no quality conscious people. Most of the food products processed on these machines do not even confirm to Indian standards and hence can not be called consumable goods. In view of rising awareness of quality in Indian populations, especially in Urban areas it has become necessary to install Hightech cleaning/processing machines and plants. These machines are equipped with adjustable quality control technology and hence they are useable on all food products like spice, seeds, grains, oil seeds etc.

Salient features of Hightech cleaning machinerys

These machines when installed with mechanized feeding and handling equipment, there is minimum involvement of labour force. These plants are designed to operate through centralized control panel so as to prevent spillage of material in the event of power failure or breakdown of even one machine.

Further these machines are designed with quality control technology and built with finely adjustable gadgets. One can set various parameters of cleaning or separating impurities/ undesirable materials. The basic principles of separation technology are employed in the machines. Over and above, these machines are developed and improved over the years on the basis of first hand field experience. Another important feature of these machines is total dust control, which is must for pollution – free working in the plant.

Thus the agro industry engaged in production of premium quality or export quality foods have no option but to install Hightech machineries and plants.

Important factors for selection of Hightech cleaning machinerys:

In general, a cleaning/processing industry should consider the following factors while setting up a plant.

Initial separation: Removal of all undesirable foreign matter from seeds/grains to obtain required product quality.

Minimum seed loss: Some good seeds are removed alongwith undesirable materials in almost every processing operation but this must be kept at a minimum.

Up-grading quality: Improvement of seed quality not only through removal of undesirable seeds but also removal of rotten, cracked, broken, insect-damaged or low quality immatured seeds.

Efficiency: Highest capacity consistency with effective separation for producing desired quality.

Minimum labour: Labour is direct operating cost and should be as low as possible, which necessitates material handling system.

Hightech machinerys: Application of separation technology:

Seed processing is based on difference in physical properties, between desirable seed and undesirable material or other crop seeds. Seed that do not differ in some physical characteristics, can not be separated. If a difference exists between seeds and a machine is available which can differentiate between them in a consistent manner, they can be separated. Seed/Grain processors can choose from wide range of machines that differentiate between seed differing in size, length, shape, weight, surface texture, affinity for liquids or color for conductivity. A single machine can not separate seeds, that differ in all these characteristics. In most instances different machines must be used to make separation based on each of these characteristics.

On the face of it, cleaning and separation operations seems very simple but from above discussion, it will be observed that there is quite a lot more. As saying goes "There is no substitute for experience", it will be very prudent for the processors to go for Hightech machines from a well established and highly experienced manufacturer.

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Food Processing and Packaging: Hazards & Solution

by
Ashesh Ghose — ACA

During processing and packaging of food there are a lot of hazards e.g. salmonella, microbes, endotoxins, adhesives, solvent, inks that makes life difficult for the consumers, doctors and companies packaging and manufacturing food products.... Earlier generation people would eat raw, unpacked, unprocessed food. There were no TV ads, no flexible laminates, no shelf-life tenure in glamourous supermarts and departmental stores and glitz retail outlets.

Now-a-days the entire food-chain has changed beyond recognition. Farmers still produce crops. The produce is marketed through co-operatives or government set up agencies. Certain goods e.g. potato is purchased by huge conglomerates or trans-national corporations. In huge modern hygienic sterilized or air-conditioned factories they convert potato into inert nitrogen gas flushed, laminated, 8 colour rotogravure - printed, flexible ready to consume-or-store packaged potato chips.

Now just as technology is the servant of man, the flipside of convenience is that at every stage of growing, handling, washing, frying, adding spices, flavours, cutting, packing, printing, laminating, nitrogen flushing, distributing, transporting or simply eating, the entire food-chain is vulnerable to kamikaze style attacks from virus, bacteria, toxins, chemicals, pathogens, pesticides, microbes, micro-organisms. This results in panic, epidemic, bad publicity, bad press. calls for closure, political hazards, in rare cases even death of one or more consumer, food-poisoning, stomach upset, infectious diseases, illness, expensive law suits etc. As the tobacco industry and genetically modified foods industry is learning to it's discomfiture that courts and adverse public opnion can destroy any business.

Now we are going to discuss the biological hazards in food processing, not ethical hazards or political hazards e,g, financially muscular MNCs forcing Indian farmers to part with their produce at dirt-cheap prices !!!

As a non-botanical, non-bio-technical chartered accountant the ideal systems solution to hazards in food processing 'n packaging would be to do an audit and analysis of the critical hazardous points in the entire process.

Common sense suggests a few critical hazardous vulnerabilities in the entire food chain - pesticides, chemicals, whether genetically mutant seeds have been used (even involuntarily) by purchases from hi-tech companies like Monsanto, temperatures at which particular microbes flourish, what type of sterilization procedures to adopt- hydrogen peroxide bath or gamma irradiation, iso-propyl acetate bath or pasteurization, ultra-violet light or cauterization, sterilization areas, special accessories of personnels in sterilization areas e.g. gloves, footwear, dangers during the curing or gestation period exposure during cutting, packing, form-fill sealing, nitrogen flushing, loading, unloading, handling, transporting etc., etc.. Other control points would be toxicity of inks/adhesives used in flexible laminates used to pack processed food, whether solvent-based inks/adhesives used or water-based inks etc. used, if water based then have biocides been added to discourage microbial growth ???

What is the shelf-life of the product, and when "best consumed before" dates have been legibly printed along with PCRO panel (packaged commodities regulation order) on package ???

Besides medical or biological hazards, packagers and processors have to be alert against some other risks e.g. aesthetic ones in mango juice where a single molecule of oxygen can oxidize the rich golden colour into dirty, muddy, brown which the fruit drinks conglomerates will then ruthlessly reject. The laminate will require aluminium foil of sufficiently thick micronage to ensure zero oxygen penetrability. Whether endotoxins which as dead proteins may be present in poly at extrusion itself or "ab initio" as lawyers are fond of saying are going to affect the foodstuffs???

Whether between poly-propylene and polyester and linear low density poly which is more suitable for our product as per modified atmosphere required inside the package ??? Lastly the difference between hazards and solutions will always be like the improved warship and the more improved version of the torpedo. Ship-makers will always try to create new, improved "unsinkable" warship but missile-makers will go back again and again to the drawing boards and improve their bombs, missiles or torpedoes until they sink the unsinkable. Similarly with all the best precautions taken bacteria and virii will continue to mutate and evolve into deadlier and deadlier varieties which will continue to contaminate food products for generations to come breaching the best of defences.

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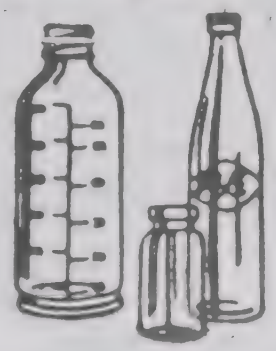

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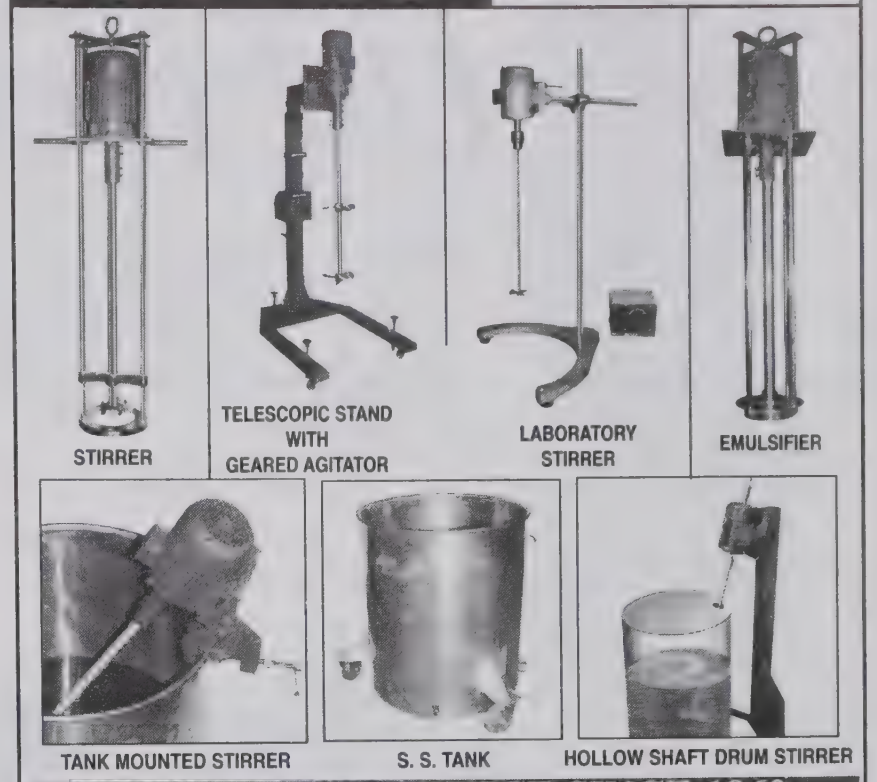

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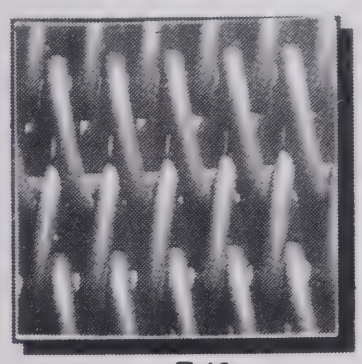

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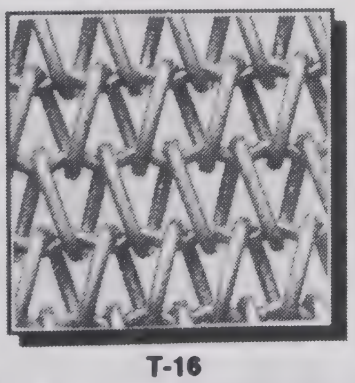

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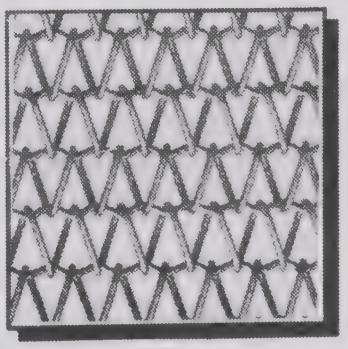

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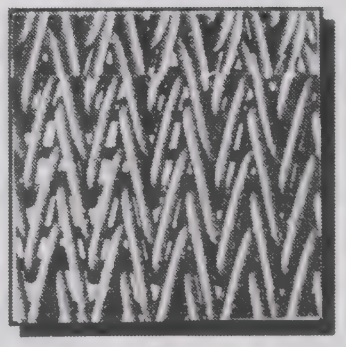

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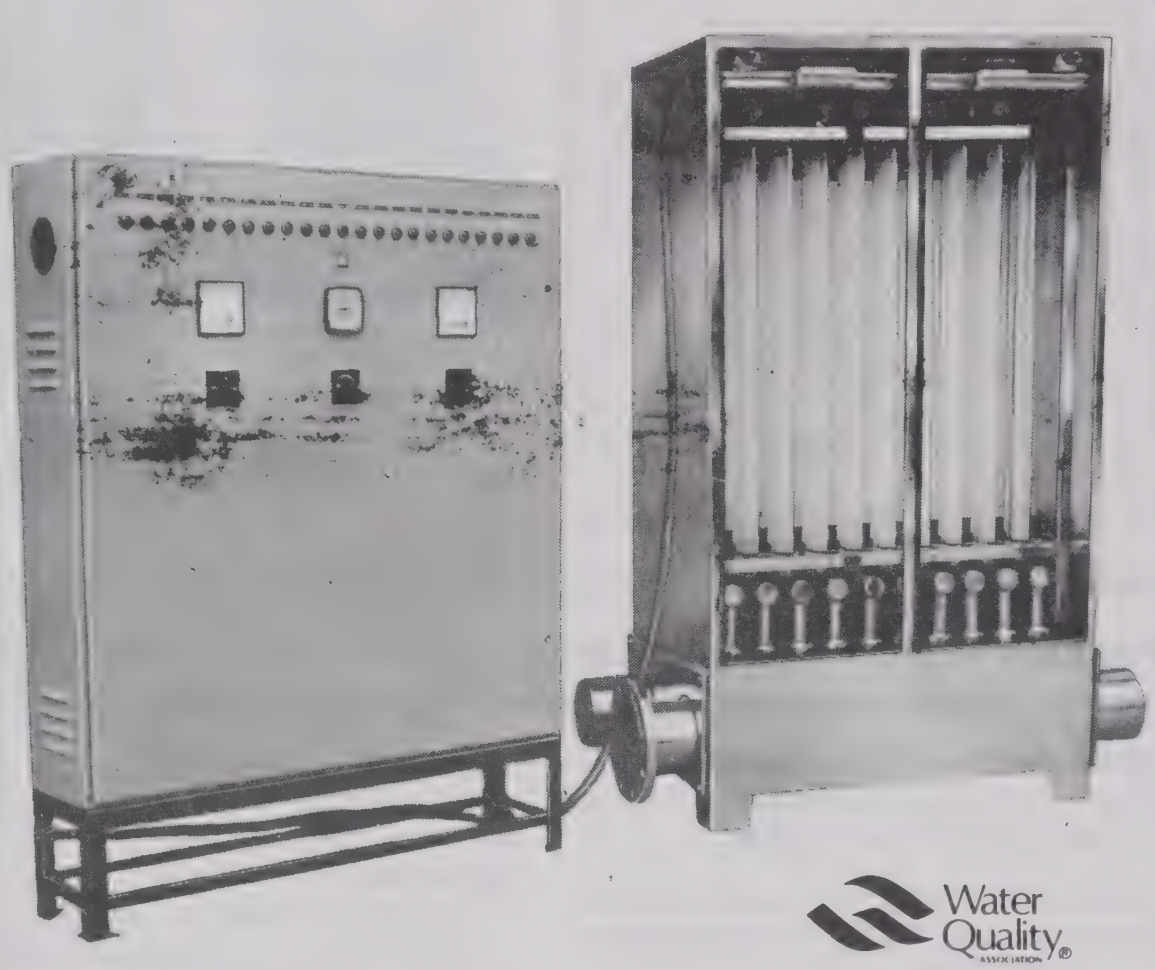

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Polymer Blends in Packaging Industry — The Present Status and Future Prospects

by
Golok B. Nando

Abstract

A recent trend in the polymer industry is to blend one or more polymers homogeneously to obtain a set of specific end-use properties, uncommon to either of the blend constituents. This trend has grown at a rapid pace in every field of its application spectrum and every other polymer product has been a blend of two or more polymers of different types.

Attempts have been made in this lecture to discuss the various aspects of blending of polymers such as choice of polymers, processing conditions, processing equipment, characterization, morphology and performance with respect to specific application areas. The effect of packaging materials on food during storage and the effect of environment on these materials as well as barrier protection efficiency of these materials will be emphasized in comparison with single conventional packaging materials. Tailor made materials for application in the food packaging industry will be highlighted and the future prospects of this technology in the food packaging industry will be discussed keeping in mind the environment concerns.

Introduction

Packaging is a multi-billion dollar industry worldwide (around 400 billion dollars). Only in USA, it touches 200 billion dollar mark. In India, Packaging industry is booming at a rapid pace with the advent of plastic industry in the country, in the last two decades.

Packaging has been broadly defined as the protection of the materials of all kinds by means of containers to prevent damage to the contents by outside influences more specifically from the adverse effects of the environment. The package is the physical entity that functions as a wall between the contents and the exterior. It is considered to be an unit operation in chemical engineering. Packaging has been divided into two broad categories.

I. Primary packaging;
II. Secondary packaging

Primary packaging may be sub-divided into two categories: (a) Aseptic packaging; (b) Conventional or traditional packaging.

Aseptic packaging means absence of putrefactive micro-organisms. It is accomplished by pre-sterilizing a product and filling into the sterilized containers.

Besides other materials which need packaging, the most indispensable materials are food, that are grown, harvested in remote regions of the country and are transported to sophisticated localities and vice versa. The food we eat need to be safe guarded and protected by cans, bottles, pouches, bags or cartoons. The pharmaceuticals need to be kept sterile and safeguarded from infection from germs, bacteria etc, by metallic foils or plastic films. It is estimated that less than 10% of the retail price paid for food is spent for packaging.

Material Selection

The first and foremost requirement of the packaging material is to ensure complete protection of the contents from overt and inherent adverse effects of the environment. Two essential components are involved.

i) Selection of the proper materials of each type
ii) Cost of packaging.

Packaging materials may be broadly divided into two principal categories.

a) **Soft materials:** Include, paper, cellophane, cardboard, soft plastics, laminated products and fabrics.
b) **Hard materials:** Include wood, hard plastic, masonite, glass, metal and fibre.

Criteria for selection

Essential criteria for selection of the packaging materials are:

i) Extent of protection needed: Must not impair the quality of the contents especially of food products, which should retain their wholesomeness and sustain no injury in handling or transit even after several months. Quality of merchandise should remain as good as it was the day when packed.

ii) Moisture proofness: The moisture content of the product should remain the same as when it was packed. A slight change in moisture content would alter the properties. This applies to food, cosmetics and other corrosive materials. Again increase in moisture content in certain food products would cause caking and destroy their wholesomeness, palatability and taste.

iii) Strength of container: Whether the materials need primary packaging or secondary packaging for transport, shipping etc., need to be considered, e.g. pies and cakes made everyday in hundreds are packaged. But they are further packed in cartons or boxes for delivery and distribution.

iv) Corrosive by acids and alkalies: Protection against chemical action of acids and alkalies need to be considered. Soft materials, wood and metals are unsuitable. Glass and certain types of plastic are suitable. Metals are protected from environmental effect by grease and oil or coatings.

v) Resistance to grease: Greases are very active solvents for various materials, such as rubbers and plastics. Thus, the packaging materials under such environments will have to be resistant to grease. Since, grease dissolves printing ink, the ink from the labels may be removed under such conditions causing confusion in identification of the products.

vi) Protection against salt: Sea water and salty air may deteriorate the packaging materials, during transportation through sea and may damage the packed materials. Hence, the package material must be able to withstand sea water, salty air and humidity.

vii) Resistance to micro-organisms: Most packaging materials including certain metals, plastics and glasses are treated specially for protection against mold growth, bacteria and other microorganisms.

viii) Resistance to insects and rodents: It is the most difficult task in the packaging industry. Materials should be treated to resist damage due to insects and rodents. Pests generally attack foods and soft materials. Insects such as locusts and rodents such as rats and mice attack all types of materials, wood and mesh. For efficient protection from rodents, two types of packaging materials are used very often.

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ix) Difference in temperature: Protection should be insured against difference in temperatures e.g. High heat and sub zero cold. Preference should be given to materials, which are poor conductors of heat. Metals should be avoided. High heat may cause undesirable changes in the packaging material and their contents. Some materials become brittle, others dilate or warp. Some poor insulators change the wholesomeness, quality, taste and odor of the contents inside. Low temperature may cause brittleness of the packaging materials, warping and contraction in others leading to break down of the contents.

x) Light: Excessive light may cause discoloration of some packaging materials and photo chemical changes in others e.g., white glass enables photo chemical changes in beer and in some chemicals.

xi) Fire: When the packages do not have extra protection from outside packing they shall be fire-resistant. Preference will be given to materials with high heat resistance property.

xii) Resistant to smoke, fume and gases: The packaging material must be resistant to smoke, fume, corrosive gases and other harmful vapours. The gases must not diffuse through the material and come in contact with food inside, changing odour, taste and quality of the protected materials.

Development of polymers as packaging materials

In the period from 1900 to 1942, transparent films were made by hydro-chlorination of natural rubber known as Rubber Hydrochloride or commercially called 'pliofilm'. It contained approximately 30% chlorine. It has high tear strength and lower permeability to water vapour. These were widely used in food packaging, e.g., in packing cheese, fish and other odorous food. It also retains moisture. However, advent of the plastic films in the second half of the twentieth century, ate the market prospects of the pliofilm. Plastic films became more widely used in packaging applications and were cheaper too.

Table 1: Some Matrix Resins/Polymers and Modifying Polymers

Property to be modified	Matrix resin	Modifying polymer
Impact strength	PVC, PP, PE, PC, PA, PPE, TPE	EPR, EPDM, ABS, ASA, SBS, BR, SAN, MBA, HIPS, Polylefins.
HDT, Stiffness	PC, PA, ABS, SAN	TPEs, PPE, PC, PSO
Chemical/Solvent resistance	PC, PA, PPE	TPEs, Co-polysiloxane, Polyphosphates
Barrier Properties	Polyolefins	PA, EVOH, PVC12
Processability	PPE	Styrenics
	PET, PA, PC	PE, PBR, EVA
	PVC	CPE, Acrylics
	PSO	PA
	PO	PTFE, SI
	HT thermoplastics	TPU, LCP
Flame retardancy	PA, PC, ABS, Acrylics	PVC, CPE, PSO, Co-polysiloxanes and hosphazenes
Puncture resistance, Low temperature flexibility and sealability	LLDPE	VLDPE

Polyethylene (PE)

Polyethylene films (PE) became very popular because of its low density, better performance characteristics and economic reasons. Polyethylene films play an important role in packaging in the present day scenario. Some of its important attributes are:

Very good chemical resistance, water resistance, resistant to non-oxidising acids, bases, salts and polar solvents (alcohols, aldehydes lower glycols etc.) Also possess excellent resistant to low temperature (because becomes brittle only at 120°C.) Articles produced from HDPE retain shape upto 100°C, and can be sterilized with boiling water.

But PE is attacked by oxidising agents and is not resistant to non-polar solvents especially at higher temperatures (soluble in boiling xylene, toluene, benzene.)

Table 2: Useful commercial blends for food packaging industry

Blend modified	Typical properties & uses	Grades & Manufacturers
ABS/PVC	Thermoformable sheets	Abson, Abtec, Chem. Co.
Copolymer from styrene and maleic anhydride (SMA) and Polyethylene terephthalate	Transparent food grade	Arloy-2000 Arco Chem. Co.
Thermoplastic polyesters such as PBT, PET,	Convenient for blow molding	Hytrel, Dupont.
SBS/HIPS	Food containers	Kraton-D-2103, Shell Chem. Co.
PVC/PMMA	Thermoformable sheets	Kydenes, Rohm & Haas
PVC/Acrylic	Thermoformable sheets	Kydex 100, Rohm & Haas
Polysulfone/ABS	Hot water resistance	Mindel A; Amoco Chem. Co.
PS/PB (4-8%)	Food containers	Polysar, Polysar, Inc., Canada
Polyamdie (PA) & Polyolefins (PO)	Blow molding	Selar, Dupont
SAN-EPDM/PC or ABS	Light, weather resistance	Ultrastryr OSA, Montedipe
PA 6,12/ionomer (Glass fiber reinforced)	Low water absorption	Zytel 774, Dupont
PA/PO/ionomer	Blow molding	Selar, Dupont
PSO/ABS and PSO/PET (Glass fiber)	Hot water resistance high heat resistance	Mindel-A, Mindel-B Aomoco Chem.
PVDC/PE	Film application	Saranex, Dow Chem. Co.
SAN/EPDM/ABS Or PC	Light, weather resistance	Ultrastyryr OSA, Montedipe
SEBS/PDMS	Medical application	C-flex Concept
SMA/PET	Food grade transparent	Aroalloy-200 Arco Chem. co.
TPE elastomers	For blow molding	Hytrel, Dupont
TPU/SAN	Chemical & Oil resistance	Estane, BF Goodrich

PE has high permeability to oxygen and CO_2, but low permeability to water vapour. This is suitable for goods requiring 'breathing' without dehydration e.g. for storing fresh fruits and vegetables. But it is permeable to aromatics and oils, hence not used for packing toilet articles and perfumes. In thick sections, PE is white and opaque, and used as containers for milk.

PE is transparent in thin films, which depends on the degree of crystallinity. Transparancy improves with branching of the polymer. These are ideally used as wrappers for frozen poultry, frozen fish, and frozen cut meats. The thickness is: 0015 inch.

High density polyethylene (HDPE)

Significant growth of HDPE as a film for packaging industry began during 1970's. It could challenge, the LDPE and LDPE/LLDPE blends, cast PP and oriented PP as films in the packaging industry.

Polyolefin films have many properties in common, but have significant differences in their degrees. HDPE, by virtue of its higher density exhibits higher tensile strength, lower water vapour transmission, resistance (WVTR) and greater stiffness than LDPE or LDPE/LLDPE blends. HDPE is most opaque of all the three PE types, which is also desirable in some cases. Two most important applications of HDPE films are: Retail grocery sacks and merchandise bags. Trash-can liners and type writer ribbons (non-packaging applications).

HDPE is used in packaging cereals, crackers and snack foods. In these applications, clarity is not required. Therefore, translucency or opacity of the HDPE film is an advantage. HDPE films are also used to produce shipping sacks. Rubber modified HDPE film is used for medical over-wraps. HDPE films are used as moisture barrier plies in multiwall bags. Heavy gauge co-extrusions of HDPE with LDPE are used in all plastic shipping sacks.

Very thin embossed HDPE film is also replaced for tissue paper and without embossing, it is used as inner wrap for delicatessen products (prepared food especially cooked meat etc.).

LLDPE/LDPE blends exhibit higher tendency to elongation under load, because of their lower crystallinity, hence lower tensile modulus. This property is useful in stretch wrap applications. LLDPE/LDPE blends exhibits good clarity due to their lower degree of crystallinity.

LLDPE/VLDPE

Developed in 1950's prepared by copolymerizing ethylene with low molecular weight-olefins such as 1-butane, 1-hexane, 1-octene or 4-methyl 1-pentene in small amounts. The short chain side branches serve to disrupt the PE crystals and controls its density. Density decreases with decreasing crystallinity. The product becomes more soft and pliable, clarity as well as toughness increases.

Polyethylene	Density (g/ml)
HDPE	0.94 – 0.97
MDPE	0.926 – 0.939
LDPE	0.915 – 0.940
LLDPE	0.915 – 0.926
VLDPE	0.89 – 0.915

LLDPE (with 1-butene) has excellent clarity and sealability, used in low-end applications, such as in poultry and frozen food packaging.

VLDPE offers outstanding puncture resistance, low temperature stability, flexibility and good sealability. VLDPE is used in Co-extrusion in blends with LDPE, HDPE or LLDPE. It is used in meat packaging shrink films and frozen food packaging. Blends of LLDPE and VLDPE are used in bakery bags, household food bags, garbage bags, grocery sacks, ice bags, medical packaging, shopping bags and draper back sheet.

Polypropylene (PP)

Isotactic PP obtained by stereo-specific polymerization of propylene using Zeigler-Natta catalysts is a highly crystalline plastic with melting point of approximately 170°C. It resists aggressive chemicals better than PE especially at increased temperatures but is dissolved in aromatic and chlorinated hydrocarbons above 80°C. It has a density of 0.90 – 0.91 $g.cm^3$, tensile strength of 30 MPa, elongation at break of 700%, impact strength of 10-15 kJ m^{-2}, heat resistance (Vicat) of 30 – 90°C, modulus of elasticity of 1500 MPa, compression strength of 110 MPa and volume resistance of 1014 – 1016 Ω cm.

PP is used in packaging industry as films, binding tapes, containers, caps and cords.

Ethylene Co-polymers

Two co-polymers of ethylene are widely used. i.e., Ethylene-vinyl aceate and Ethylene acrylic acid.

Ethylene vinyl acetate co-polymers are widely used as shrinkable films for food packaging. Blend of EVA with LDPE or with PP provides intermediate properties.

Ethylene Acrylic Acid co-polymer (EAA) and Ethylene Methacrylic Acid co-polymer (EMA) are used as ionomers in the form of transparent films (e.g. Surlyn and Iotek). The ionic cross-linking imparts toughness, elastically and low solubility but preserves its thermoplastic nature in contrast to chemical cross-linking.

Ethylene Vinyl Alcohol Co-polymer (EVOH)

Commercially made available in 1972 (in Japan) US food producers used this resin for all-plastic squeezable bottles. Primarily being used in food packaging, it has excellent gas barrier properties, which is made use of in preventing oxygen degradation of the food products.

Because of its superior resistance to solvents, chemicals and hydrocarbons, has expanded its market in non-packaging and industrial applications (agricultural, chemical, automotive and protective clothing). Polyvinyl alcohol has exceptionally high barrier properties to gases, chemicals and solvents, but is water soluble and difficult to process.

On the other hand, co-polymers of ethylene and vinyl-alcohol retain its barrier properties and improve their moisture resistance property. It is not soluble in water. Has good processability. Thin layer of this co-polymer is used in multi-layer packaging structure. Gas barrier property is the best permeation of O_2, CO_2, N_2 and helium gases.

It's use as a packaging material, enhances flavour and quality retention, by preventing oxygen from penetrating the package. On the other hand, EVOH retains effectively the modified atmospheric packaging (MAP) with CO_2, O_2 or N_2 used to enhance the product quality.

EVOH resins have high resistance to hydrocarbon oil and organic solvents. Immersion of EVOH resin in various solvents for one year at 20°C shows a wt. percent increase of 0% for cyclohexane, xylene, petroleum ether, benzene and acetone, 2.3% for ethanol and 12.2% for methanol.

Its resistance to fuels, makes it the best choice for protective gloves, containing an EVOH layer.

It is an excellent choice for packaging oily foods, edible oils, agriculture pesticides, organic solvents and other industrial applications.

Flavour, Aroma and Fragrance

Food Industry is becoming increasingly conscious about the flavour barrier pertaining to food during packaging. The natural flavour of the food products, should be retaining and the package should prevent extraneous flavours from contaminating the product.

EVOH resins provide excellent protection to the migration of flavours and absorption of D-limonine, the primary flavour constituent. For food products, aroma barrier is similar to flavour barrier. Food products must be protected from outside aroma, in the distribution chain, grocery store as well as at home. Other non-food products such as garlic, agricultural chemicals, pesticides, insecticides or perfumes can be highly aromatic and must be prevented from contamination or retain the aroma in the package.

Mechanical and Optical Properties

EVOH has high mechanical properties, good elasticity, hardness, and excellent weatherability. Its films are highly anti-static, prevents build up of dusts or static charges. EVOH has very good gloss, and low haze resulting in outstanding clarity characteristics.

Processability

EVOH resins are easily processed on conventional equipment, can be blow moulded, cast film, sheet extract, or profile extruder.

EVOH resins can be used in direct contact with food products and also for high temperature lamination, used in meat and cheese packaging.

It is non-toxic. Multi-layered films of EVOH with other polymers are used. In coextrusion technology, EVOH is used as an adhesive layer or tie layer.

Polymer Blends in the Packaging Industry

A recent trend in the polymer industry is to blend one or

more polymers/co-polymers homogeneously to achieve a set of end use properties uncommon to either of the blend components, for specific applications. These tailor-made properties may be achieved by simple melt blending where the morphology of the blend plays a major role or through reactive processing, where the blend itself behaves as a separate entity from either of the constituents, quite often showing gross synergism. In some cases, grafting and compatibilization lead to materials with composite structure and properties, akin to a new material. It has an edge over the new materials synthesized by solution polymerization technique.

Table 3: Polymer Blends in the Packaging Industry

Polymer-1	Polymer-2	Property improved
LDPE	LLDPE	Tensile strength, elongation at break, modulus puncture resistance, clarity
VLDPE, LDPE HDPE, LLDPE, PP	EEA	Toughness, flexibility, adhesive property
PA, PET	EEA	Impact resistance
VLDPE, LDPE, LLDPE, PP, PC, PET, PA	EMA	Impact resistance, toughness, heat-seal property, adhesion strength
LDPE, PP	EVA	Flexibility, surface gloss, tack
LDPE, LLDPE	EVOH	Gas barrier property to O_2, CO_2, N_2
PP, PE	EPR	Impact resistance
LDPE, HDPE, PP	EAA	ESCR, Puncture resistance, tear strength abrasion resistance
VLDPE	LDPE HDPE LLDPE	Strength, translucency, moisture barrier

Blending of rubbers predates to that of thermoplastics by nearly a century. Original idea of gaining extra performance by blending was credited to Thomas Hancock, who by mixing NR with guttapercha produced the first blend between a rubber and a thermoplastic. (He used it for applying on a water proofing cloth) way back in 1846. Commercial applications of blends could be made effective after discovery of plasticization of PVC (in 1927) although PVC was known since 1872. Discovery of NBR in 1942 and its ability to permanently plasticise PVC changed the whole concept of blending. PVC/NBR blends were the first set of polymer blends to be commercialised.

In 1942, a blend of polystyrene and polybutadiene (stralloy-22) was introduced by Dow Chemical Company, as a precursor of IPN.

A mechanical mixture of NBR with SAN was developed in 1942, which opened up a floodgate for a large number of polymer blends and alloys.

In 1960, a modern engineering polymer blend was developed by adding PS to poly-2,6 diethyl 1,4 phenylene-ether (PPE). It made the blend process well and the system was found to be miscible. Its density increased and the blend exhibited synergistic behaviour. A whole family of Noryl blends were commercialized in 1965.

In 1969, Coran and Patel discovered a blend of PP and EPDM which was commercialised by Monsanto Chemical Co. under the trade name *Sant. oprene.*

In 1979, an impact modified polymer blend of PC with polybutylene terephthalate and/or PET was introduced in the name of Xenoy by General Electric Co., USA. In 1982, Dupont introduced Selar, a modified and compatibilized amorphous polyamide to be used as an additive to polyolefins to reduce permeability.

In 1984, Mobay Chemical Corporation developed a PU elastomer and PC blend for use in automobile industry, in the name of Texin. In the same year, they developed a Macro blend of PC/PBT/Elastomer for automobile body panel.

Apart from achieving impact modification by blending mechanically an elastomer with a crystalline thermoplastic in which it is immiscible. A newer technology was introduced in which the blend components react with each other through functional groups present or through functionalization to give a grafted product or an alloy with enhanced performance properties. This is known as reactive blending, occurring in the condensed phase in a plastic/rubber processing equipment, such as in an extruder, twin screw compounder, internal mixers and/or kneader under optimum processing conditions.

How to select blend components

The golden rule in selecting the blend constituents is that the principal advantages of the one polymer should compensate the deficiencies of the other polymer and vice-versa.

For example, the disadvantage in process-ability and impact strength of PPE can be compensated by the advantages of either PA or HIPS. PPE & PS are miscible. However, PPE and PA are immiscible. But four parts of a modifier such as polycarboxylic acid, trimellitic anhydride acid chloride, quinone, oxidised polyolefin wax, made them compatible forming alloy. PA forms a matrix with spherical inclusions of PPE acting as compatibilized low density filler.

Weakness of PC such as stress cracking and chemical sensitivity are overcome by incorporating ABS or ASA and TPEs (thermoplastic polyesters) a semi-crystalline polymer respectively. Since impact strength and warp resistance of TPEs are poor, a blend of PC and TPEs with an acrylic latex co-polymer will be the ideal choice.

Conclusions

1. Polymer packaging in the country is still at its infancy.
2. There is tremendous scope and opportunity to replace forest based packaging materials by polymers and polymer blends e.g. bamboo baskets could be done away with polymer baskets and can still be used repeatedly.
3. Use of polymer and polymer blends may create disposal problems, which can be overcome by scientific methods of recycling.
4. Manufacturers as well as customers need to be educated for proper utilization of polymer packaging materials
5. More research needs to be carried out in the area of biodegradation of polymers and their blends.

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Motorized Shredding — cum — Stone Extracting Machine for Aonla

by
S.S. Kapdi, V.B. Bhalodia and D.C. Joshi

Introduction

Aonla (Emblica officinalis, Gaerin) is the most important fruit crop of arid region of India. Commercial level cultivation of aonla can be seen mainly in Uttar Pradesh and Gujarat State. Annual production of aonla in Gujarat is estimated to be about 2000 tonnes (Anon. 1991). Aonla fruit is very popular for its medicinal property recorded both in Ayurveda and Unani system of medicines. It is a rich source of vitamin C. About 600 – 900 mg of vitamin C is found in 100g of aonla pulp (Kikani ***et al.,*** 1993). Due to this, aonla has a high demand in pharmaceutical and other allied industries i.e. soap, shampoo, hairdye, ink etc. Besides this, *chyavanprash*, squash, jam, candy, *triphala*, pickles, *mukhavas* (salted dried flakes) etc. are prepared from aonla. For most preparations, stone is required to be remove from the fruit, while for *mukhavas*, pickles, *triphala*, and candy, shreds are needed.

The shredding and removing of stone from aonla is done manually, due to non-availability of mechanized machines. Manual process is not only tedious and time consuming, but is also difficult to manage because of labour scarcity during the aonla processing season. Besides this, it also causes injuries to the skin and hands of labourers due to ascorbic acid content in aonla. Hence, a hand-operated gadget was developed earlier for aonla (Kapdi ***et al.,*** 1999). But capacity of the gadget was very low i.e. 12 kg/h. Therefore, a continuous motorized machine for shredding and stone extraction from aonla with a capacity of 60 – 70 kg/h has been developed, the features and performances of which are reported in the present communication.

The principle of working of the machine is of gradual scraping of the pulp from all around the fruit till the inner stone is free from pulp. Due consideration was given to the fact that uniformly coarse size shreds are produced which will find direct use and the seeds inside the stone are undamaged to achieve maximum germination. Aonla fed to the machine is made to pass through the gradually reducing clearance between the roller and the stationery concave sieve, where it is continuously scraped and shredded while simultaneously conveying forward. A detailed drawing of the machine is shown in Fig. 1. The major parts of the machine are: frame, taper roller, drum chamber with concave sieve, discharge chute and power transmission system.

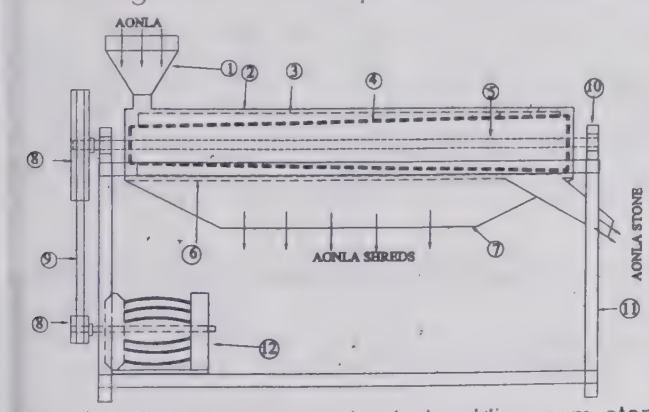

Fig.1. A Continuous motorized shredding cum stone extracting machine for aonla

Sr. No.	Component
1.	Feed hopper
2.	Top cover
3.	Canvas scraper
4.	Taper roller
5.	Central shaft
6.	Concave sieve
7.	Discharge chute
8.	Pulley
9	V.Belt
10	Pedestal
11	Frame
12	Electric motor

Frame: It supports all the parts of the machine and is fabricated out of 35 × 35 × 5 mm mild steel angles. The frame size is 1370 × 330 × 650 mm. The power transmission system, drum chamber with taper roller, concave and discharge chute is rigidly fitted on the frame. Pedestals and bearing have been fixed in the slots provided on each end of the frame, for mounting the central shaft.

Taper roller: The machine has a rotating taper roller fitted inside the drum chamber. The diameter of the roller at feed end is 100 mm and that at the discharge end is 150 mm. The length of the roller is 1200 mm inclusive of the end plates. The roller has been made from stainless round bars of 8 mm diameter and 1200 mm length. In all, thirty-two such round bars are used. The bars have been welded with the end plates on both the sides in such a way that there is a forward angle of 8 degrees from the feed end side. The forward twist has been provided to convey the material towards the discharge end. Two scrapers made up of 5 mm thick canvass belt have been fitted with bar no. 1 and bar no. 17, to scrape the material against the perforations of the concave. The roller is mounted on a stainless steel shaft of 25 mm diameter and the shaft is fitted to the frame with the help of bearings.

Drum chamber with concave sieve: The cylindrical drum chamber is made up of two equal halves namely, top cover and concave sieve. The top semi circular half of radius of 97.5 mm, is made from 1 mm thick stainless sheet with an opening of 100 × 50 mm near the feed end. There is a projection of 40 mm height at the opening, so as to push fit the feed hopper. The lower semi circular half is the concave sieve, having 1230 mm length and 97.5 mm radius, also made from 1 mm thick stainless steel sheet.

The slit shape perforations of 25 × 4 mm size and 25 mm apart have been cut throughout the concave in zigzag fashion. An opening of 110 × 65 mm has been provided at the discharge end of the concave for the discharge of the aonla stone and an inclined scoop has been welded there to guide the stones to a collecting pan kept below.

Discharge chute: A trapezoidal shape discharge chute of 1230 × 195 mm top dimensions and 700 × 145 mm bottom dimensions is fitted below the concave. The sides of chute have smooth downward slope for easy flow of aonla shreds into the collecting pan, kept below the chute.

Power transmission system: The machine is operated by a1 hp, 3 phase, 1400 rpm electric motor fitted on the frame. Necessary pulleys and a V-belt are provided to rotate the taper roller at 330 rpm.

Operation: The mature aonla fruits are fed manually through hopper and pass into this space between taper roller and concave sieve. The fruits get scraped continuously by the rotating roller against the projected perforations of the concave and the aonla shreds are obtained which pass downwards through openings in the sieve. The shreds are collected in a pan kept under the machine, through the discharge chute. The aonla stones are conveyed forward in the machine while being scraped and are finally discharged separately at the other end in a container.

Performance: The performance of the machine is given in Table 1. The machine extracted the stones clear of shreds

Agricultural Product Process Engineering Unit, Gujarat Agricultural University, Anand Campus, Anand 388 110, Gujarat

completely in single pass. The whole stone recovery is 93 – 94%, with shreds obtained being 97 – 98%. Some of the shreds loss obtained in the stone outlet could be recovered (1-2%) and hence the net shreds loss is less than 1%.

The capacity of the machine is found to be 60 – 70% kg/h as against 6 kg/h in manual process. The cost of extraction for one tonne aonla is worked out to be Rs. 159, in comparison to Rs. 833 by manual extraction. The above reveals that there will be net saving of Rs. 674 for processing of one tonne of aonla by the developed machine as compared to the traditional method. The payback period for the investment on the machine (approx. Rs. 10500) comes to be 32 days for a break-even quantity of 15.5 tonnes of aonla.

Thus, it can be concluded that for aonla shredding and stone extraction, the machine developed and described above is technically competent and economically viable.

Table 1. Comparative features of mechanical and manual aonla shredding cum stone extraction

Particulars	Mechanical extraction	Manual extraction
Cost of the machine	Rs. 10500	Nil
Capacity of the machine	60 – 70 Kg per hour	6 kg per man hour
Shreds recovery (%)	97 – 98	90 – 92
Whole stone recovery (%)	93 – 94	100
Cost of extraction	Rs. 159/tonne	Rs. 833/tonne
Break even quantity	15.5 tonnes	Nil

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What Is An Industrial Filter

by
N.R. Mhatre

The basic function of a filter or a strainer is to arrest foreign particles from the fluid, before these can cause damage to costly equipment like Lubricating Equipment, Pumps, Bearings, Burners, Nozzles, Coolant Systems, etc. The difference between a Filter and a Strainer, as a thumb rule, is that generally the Strainer is a coarse Filter. The Strainer removes the particles, which are visible to the naked eye. The Filter on the other hand removes particles which are not visible to the naked eye (particles smaller than 75 microns).

This is the reason as to why, depending upon the need, Strainers are also used in series with the Filters, obviously ahead of Filters, so that comparatively larger or heavier particles are initially arrested by the Strainers, thereby reducing the frequency of replacing the Filter Element.

The design of Filters or Strainers is tailor made to suit the requirements of the customer. Normally the following parameters are required to be provided to the designer and manufacturer of filters.

- The fluid to be handled viz. Water, Oil, Salty Water, Contaminated Water, Acid, Chemicals, Fertilizers, Food, Air, Gas, Steam, Paper Pulp etc.
- Working Pressure
- Flow Rate.
- Degree of Filtration
- Operation, whether Manual of Motorised.
- End Connection desired.
- Working Temperature
- Viscosity
- Frequency of Cleaning.
- Permissible Pressure Drop.
- Working Condition at sites.

Filters or Strainers may be associated with following accessories:-

- Jacketted Design.
- Davit Arrangement.
- Control Panel
- Differential Switch.
- Vent Valves.
- Electric Actuator
- Pneumatic Operation.
- Quick Opening Arrangement
- Motorised Operation.
- Differential Pressure Gauge
- Drain Valves.
- Bypass Valve
- Hydraulic Cylinder.
- Magnetic Inserts.

As such the filtration range is a very wide and diverse field. Nevertheless the main types of filters can be generally classified as Basket Filters, Duplex Basket Filters, Self Cleaning Filters, Air Filters, Lube Oil Filters, High Pressure Filters, Separators, Pressure Sand Filters, Cartridge Filters, Bag Filters, etc.

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Packaging Materials for Perishable Commodities

by
V. Thirupathi, M. Balakrishnan & V.V. Sree Narayanan

A great variety of materials are used for the packaging of perishable commodities. They include wood, bamboo, rigid and foam plastic, solid cardboard and corrugated fibreboard. The kind of material or structure adopted depends on the method of perforation, the distance to its destination, the value of the product and the requirement of the market.

CFB Boxes

Corrugated fibreboard is the most widely used material for fruit packages because of the following characteristics: Light in Weight • Reasonably strong • Flexibility of shape and size • Easy to store and use • Good pointing capability • Economical

Construction of CFB Boxes

The corrugated board is made of paper sheets consisting of liners and corrugated medium. The medium is corrugated first, and then liner paper is stuck on one or both sides of the corrugated medium. In making the choice of materials the structure, the flute, the paper quality and the adhesive should be taken into consideration.

Fibreboard structure

i) Single faced corrugated fibreboard cannot be made into boxes. In fruit packaging, it is only used for partitions and cushioning, such as pads between layers of fruit.

ii) Double-faced corrugated fiberboard is mainly used for local packaging and for cell partitions, layer pads and cap lids. It may also be used for export packaging if an appropriate style box is selected. Two piece telescopic boxes are usually made with double faced corrugated board.

iii) Double-wall corrugated fiberboard is often used for export packaging because of its strength. Boxes made of this kind of materials have good compression strength and resistance to bulging. Boxes made of double wall corrugated fiberboard will have a greater stacking strength than boxes having two separate single panels with the same amount of fiberboard.

Flute

The flute is the amount of corrugation given to the medium. The selection of the flute is very important to the strength of the fiberboard. Flute size will affect compression strength, flat crush resistance, edge compression strength and bursting strength of corrugated fiberboard. Characteristics, flute sizes are designated as A, C, B and E, in descending order of height and increasing number of flutes per meter.

Type A – Very high compression strength
Type B – Thin structure but high flute density
Type C – Low cost, high bursting strength
Type E – Recently developed, mainly used for small folding cartons

Type A & C are mainly used for fruit packages because of high compression strength stiffness and good cushioning. For double wall corrugated fiberboard boxes, either the combinations of A and C flutes, A and B flutes or C and E flutes can be used.

Paper Quality

A wide variety of paper is available for making corrugated fiberboard. The properties of the liner papers and of the corrugated medium have a very big influence on the quality of the fiberboard, and ultimately on the performance of the fruit package.

The basic specification of paper is its substance, or weight per square meter. However, the species of tree from which the paper pulp was made, the manufacturing process, the addition of reclaiming paper pulp and the addition of chemicals will all affect the paper quality. Manufacturers of fibreboard for fruit packages should select the liner paper or corrugated medium because of their specific properties. For example, high tensile strength is required in the outer liner papers and good stiffness on the inner liner paper.

Adhesives

The adhesive used to join the liner papers to the corrugated medium is an important aspect of the corrugated fibreboard specification. The cheapest adhesive is cornstarch, which is quite satisfactory for packages not subject to high moisture conditions. Fruit packages are exposed to high humidity conditions in storage or even to free moisture from rain or condensation on their cold surfaces when removed from cold storage. A waterproof adhesive is essential to avoid delaminating of the fiberboard and failure of the package. Water proofing chemicals can be added to the starch, or special waterproof adhesive can be obtained. Waterproof adhesives must be used for all export fruit packages. It is also important to use sufficient adhesive to obtain complete adhesion of the liner paper to corrugating medium.

Wooden boxes

Materials used for manufacture of wooden boxes include natural wood and industrially manufactured, wood based sheet materials. Timber used for manufacture of packages must be inexpensive and easily worked. Poplar is widely used for peeled board. Due to the straight grain of the poplar wood, the material can be cut in thin sections, this saves the material, storage space, weight and freight cost. In addition, poplar wood itself is light, which further reduces the weight of the package. All wood that is used for the production of the packaging should be well dried in order to prevent cracks and mould growth later. The fastenings always represent the weakest point of a box. With thicker gauge materials, both nailing and stapling or wire stitching may be used successfully provided that the clenching is sufficiently strong.

Sacks

Sacks are traditionally made of jute fibre or similar natural materials. Most jute sacks are provided in a plain weave. Natural fibre sacks have in many cases been replaced by sacks made of synthetic materials and paper due to cost factors, appearance, mechanical properties and risk of infestation and spreading of insects. Sacks made of polypropylene of plain weave type are extensively used for root vegetables. However, even with extensive perforation, ventilation is rather poor, and such sacks are generally unsuitable for export packaging. The most common fabric weight is 70-80 grams per square meter. A plastic film lining inside is not normally considered necessary.

Manufacturers make up natural fibre sacks and open mesh woven plastic sacks by sewing them together. Woven PP sacks are generally produced by circular weav-

Department of Agricultural Processing, Tamil Nadu Agricultural University, Coimbatore 641003.

ing and sewing in the cross direction. Knitted sacks are often heat-sealed in the longitudinal direction and sewn in the cross direction. Paper sacks are made of two or more plies of Kraft sack, which is pure sulphate paper of the best quality, usually having a substance of 70 grams per square meter or slightly more.

The sacks are made from reeled paper, which is pasted into a set of interleaved tubes. These multi-ply tubes are cut to length and gluing or sewing forms the bottom. When glued, cross bottom constructions may be produced. Using sewing techniques, only flat sacks can be made. Filled cross bottom sacks are more stable on pallets than filled flat sacks.

Palletisation

Pallets are widely used for the transport of fruit packages, in all developed countries. The advantages of handling packages on pallets are:

1. Labour cost in handling is greatly reduced.
2. Transport cost may be reduced.
3. Goods are protected and damage reduced.
4. Through high stacking, storage space can be more efficiently used.
5. Pallets encourage the introduction of standard package sizes.

In designing export packages, their handling on pallets for shipping or for transport and storage within the importing country, is an important factor. As the most common pallet size is 1200 mm × 1100 mm these external dimensions make no allowance for manufacturing tolerance, packaging bulge, compression bulge, unitizing devices or bad stacking. The unit load must fit completely on the pallet and must not be overhanging in any direction.

Package size

The dimension of a package must:

a) Suit the fruit sizes and shapes.
b) Meet the requirements of the importer.
c) Be efficient in transport.
d) Be easy to pack and handle.

Over many years packages of many dimensions have been tested. L : W ratio of 1.5 : 1 is most accepted. Packages nearer 1 : 1 are less pleasing in appearance and difficult to fit on pallets, while packages of 2 : 1 are unstable in column stacks. Packages where height is greater than width are less stable than more shallow packages.

Ventilation of Packages

Reduction of moisture loss from the product is a principal requirement limited permeability-packaging materials. A mesh or a paper bag unitizes few or many fruits, but such bags do not restrict moisture loss from the product. A solution to moisture loss problems from produce appeared with the development and wide distribution of semi permeable plastic films. If plastic films are too permeable to water vapour it offer advantages. However if they are impermeable, water vapour transpires from the packaged products and rapidly approaches or reaches saturation. Further permeability to CO_2 and O_2 undesirable atmosphere modification would occur in the container. The solution to obtain the desired relative humidity in the package and preventing changes in CO_2 and O_2 concentrations emphasize in controlled ventilation, based specifically on optimum relative humidity for each packaged product.

Airflow through the ventilation holes allows hot fruit to slowly cool and avoid the buildup of heat produced by the fruit in respiration. Holes are also important in cooling the fruit when the packages are placed in a cold storage, especially with forced air cooling. Ventilation holes improve the dispersal of ethylene produced by the fruit, but they are of little importance in oxygen or carbon dioxide transfer as these gases pass easily through fibreboard. If a plastic bag is used inside the fibreboard box to create a high humidity or to reduce oxygen in the fruit atmosphere, the holes in the box will not be effective.

The position and size of the holes

If the holes are too near to the top, bottom or the edges of a box, the compression strength of a box will be reduced. If the holes are too near to the centre, the stiffness of the box will be greatly reduced. The usual diameter of holes is 25.30 mm. The total number of holes should not exceed 3.5% of the area of the package face unless required for forced air-cooling. If hand holes are necessary they should be near the top of the end walls. Two smaller finger holes placed 30 mm apart will cause less reduction of compression strength than one hand hole and will reduce the risk of cuts on the fruit by fingernails.

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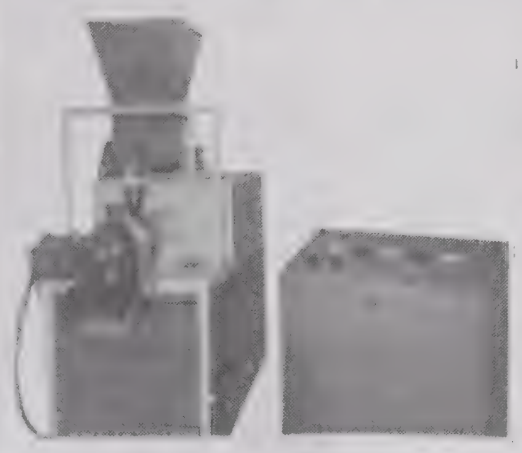

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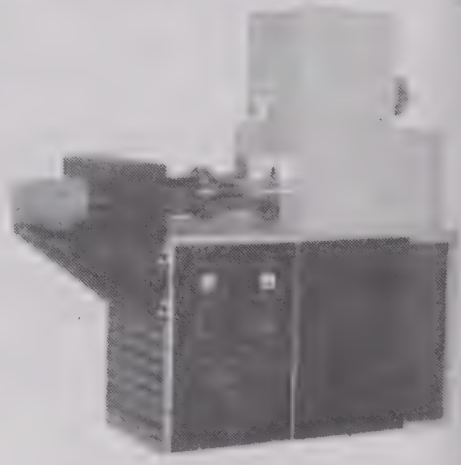

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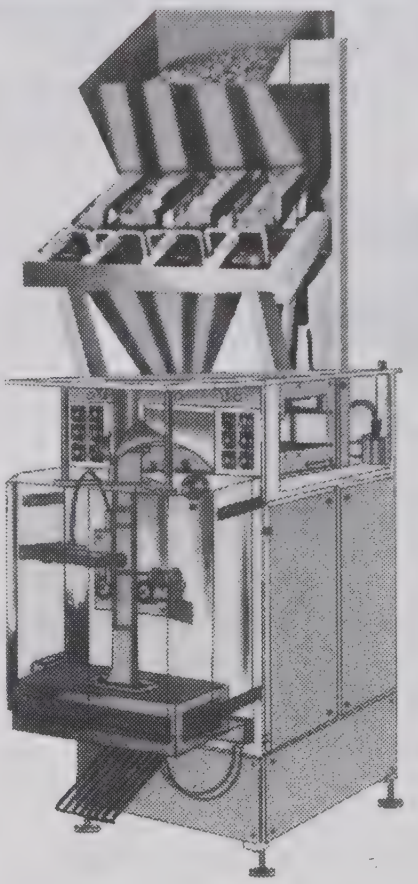

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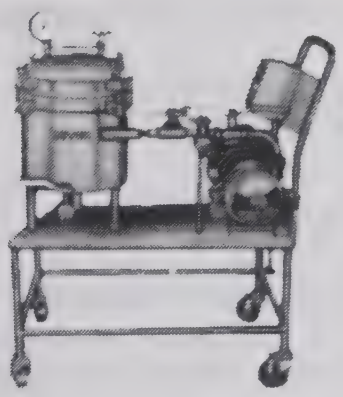

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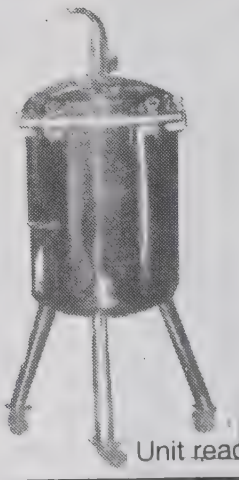

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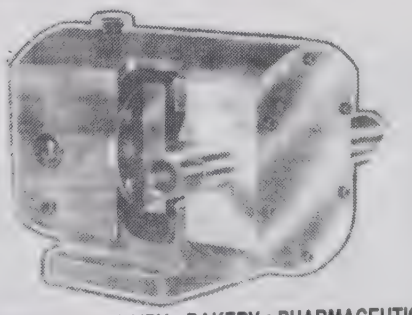

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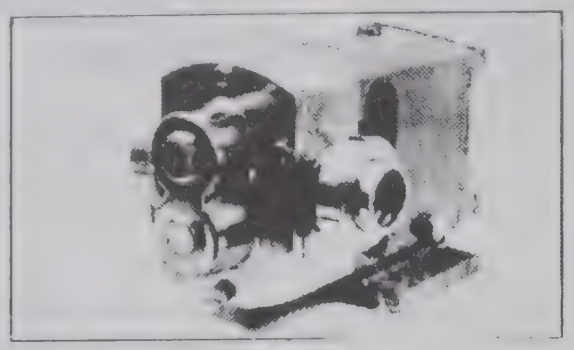

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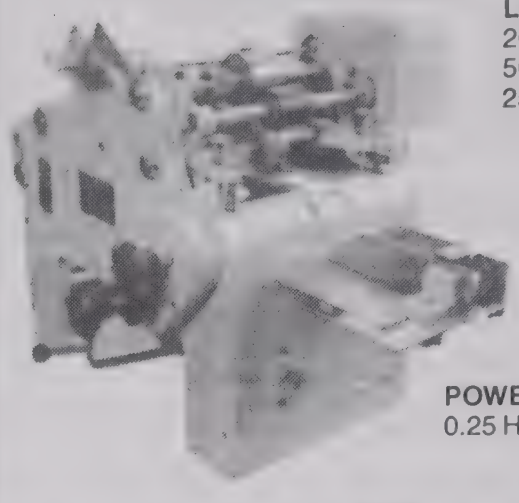

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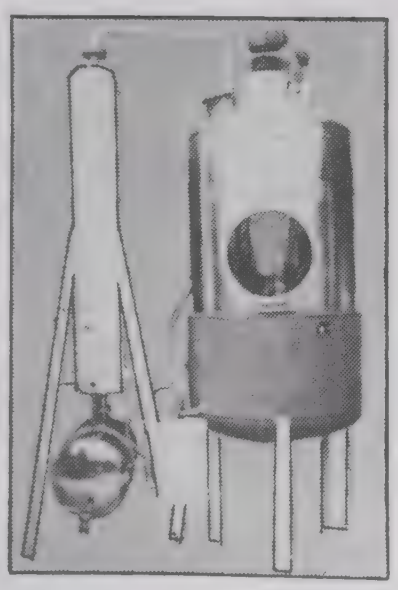

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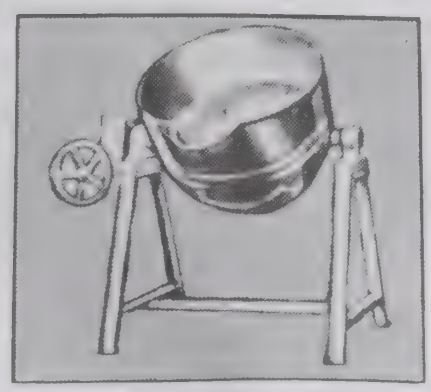

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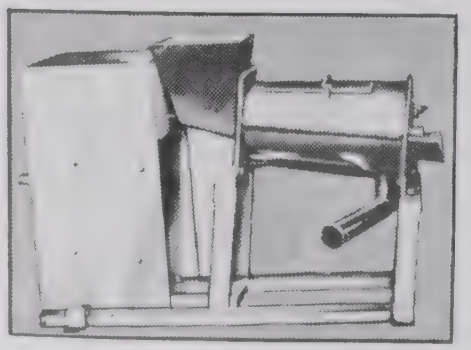

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Advantages of Glass as a Packaging Medium for Food Products

by
V. Vijaya Sanker

Necessity of Packaging

The fact that the location of the production of goods is often not identical to the location of consumption makes packaging necessary. The package must be able to protect the goods.

The Right Packaging
An Imperative need Today

There have been major developments in packaging since the 50's. Its main role was first, and for many years, a technical function concerned with preserving, handling and transport of products for distribution and consumption.

In addition to its function in transport and as a protection against environmental influences, packaging has now acquired a series of other functions from the fulfillment or non-fulfilment on which depends success or failure in the market. The "package" must attract attention, it must provide information, it must gain the buyer's favour and facilitate consumption of the product. The first three of these functions were, until the introduction of self-service, filled by the sales lady in the shop.

Food and Beverage Processing

Over the past 15 years, we have produced a convenient throw-away consumers society and this is having a major effect on the packaging market. Traditional packaging media are being challenged successfully and competition has become fierce amongst all the packaging alternatives.

There are dynamic technological changes taking place within a major industry. The world of packaging is no exception to this universal law of change which seems to be governed by the word "convenience".

Change factors

The change factors involved are: • Packaged material • Less consumption • Favourable costs • Adequate superior performance • Convenience.

The evolution of the distribution structure, the self-service sale in larger and larger stores brought a second dimension to its function, namely *Communication*.

Today, packaging has a third function, *Innovation* and that for the following reasons:

The social and economic environment in which we are living is dynamic: it is changing.

Consumers, now, are better off, more active, more informed, more pressed for time, are making noticeable changes to their habits, especially regarding food.

Governments endeavour by regulation or encouragements to require more resistant products, easier to handle and to recycle.

Technologies too are developing quickly and bringing to consumers a choice which is both wider and more sophisticated.

All these factors have a simultaneous action/consequences and packaging must reflect them – it cannot ignore them.

To make available attractive packaging which protects the filled product from contamination, this can be produced, filled, sealed, distributed, and discharged at a reasonable cost and low risk to the environment, easy to open, eventually to be re-closed, and to be emptied completely by the consumer.

Vice President, AGI Glaspac, Glass Factory Road, Off Moti Nagar, P.B. No. 1930, Sananthnagar P.O., Hyderabad 500 018.

Glass as an ideal packaging medium

Glass Packaging: Core than just a packaging solution.

We no longer sell an empty glass container. We bring a glass packaging solution to a packaging problem.

The theme of this convention being glass as a packaging medium, let us also see what are its chances in the current battle between all types of packaging materials? Will glass be competitive for a long time to come towards challengers who are permanently innovating? What are the advantages of glass over other packaging media?

There are absolute no answers, but here is an attempt to highlight its obvious advantages which make it superior to other alternative media.

It is noticed that

a) The consumer surveys which we have at our disposal today, generally show that, for food products, glass is the consumer's indisputable preference.
b) Glass containers still have, in most countries and particularly in Europe and Asia, a strong position.

Changes in Glass Packaging

It is both difficult and dangerous to make general statements about the glass packaging market because conditions vary in the different markets, but this section of the presentation will cover both general and specific information as it has become available with particular reference to India.

The consumer

The most important factor in the market is the consumer and so often we know very little about him, his likes and dislikes and his hopes and fears for the future.

There are three trends, that have emerged over the past few years:

— Changing attitudes towards time.
— Changing attitudes towards money.
— Changing attitudes towards social costs.

Changing attitudes towards time

With all the modern convenience one would assume, women have more time today than their grandmothers. But this is not the case, because more women go out to work, and because they are using time for their own leisure activities, in addition, many have the family needs to attend to.

This has created an enormous pressure for time through:

— fast-food meals
— micro-wave ovens
— instant coffee, tea, soup.

Convenience has become a necessity, not an indulgence.

A packaging market research question for the future is: "Will it save me time?"

Changing attitudes towards money

Inflation is changing the view of money. Pleasure now is the demand, not saving and enjoying it in the future. The result is unprecedented spending and very little saving. And so, just as there is pressure on the allocation of time, there is pressure on the allocation of money. The shopper is getting more critical. They look at the labels and many

read the ingredients. They will pay more for a natural product.

The shopper cannot control prices, they do not have much control over their income, where they can exert control is in deciding what to buy.

The packaging research question is "What am I getting for my money?

Changing attitudes towards social costs

The consumer's increasing alertness to social costs will focus attention to this aspect of packaging.

A recent consumer study rated the six most important attributes of packaging materials for food products as:

- keeps contents fresh
- does not flavour the contents
- prevents spoilage
- taste of contents does not change
- safe for children to use
- after opening, freshness can still be preserved.

Then, the study asked consumers to rate packaging materials in each of these attributes. Glass was the number one choice, except for the safe attribute regarding children, where plastic won the approval.

Then, a rating was obtained for convenience:

- easy to pour from
- light in weight
- does not need to be transferred to another container
- one can see what is left over
- easy to store.

Glass was first for "no need to be transferred to another container" and "you can see what is left over". Plastic won over the other three.

Then, a rating was obtained for environmental factors:

- preferred because people are concerned about the environment.
- made from raw materials abundant in the country
- recyclable
- refillable.

Glass won three, but cans were first on recyclable.

Of these 15 attributes, glass won 10, plastic 4 and metal cans1. This is what the consumer says today, but what about the future trends. How will glass respond to the questions, the consumer will be asking?

Today, in spite of glass being the most eco-friendly, and the most ideal packaging material despite its presence for the past 100 years or more is under severe threat from the substitutes. It is reported that the growth prospects for glass packaging in the developed countries have not been very encouraging, as glass was partially lower developed in comparison to other packaging materials in the soft drink and other sectors. However, the levels of consumption of packaging glass in Northern America is said to be currently 40 times higher than that what is today in India and China. Let us, as such, proceed on the presumption that glass has an enormous potential as a packaging medium in our country and examine in detail what specific advantages glass packaging holds out for the food and beverage industries, the potential threats and its future prospects.

The low level of glass use in the developing markets, especially India, China and South Eastern Countries because of the low labour costs and rapid growth prospects have attracted Glass Manufacturers in developed regions. If we take packaging as a whole, glass packaging constituted 10% of the world market in value terms and the highest has been the plastic. Glass packaging remains a highly regional industry due to high transportation costs and the high cost of construction of Glass Plants. However, the saviour of glass in these countries has been the consumer's perception of it as a premium materials and consumers associate glass packaging with quality and premium food and drink sectors have provided a growth area. Therefore, we see that there has been a growth in demand for value-added glass products, along with various decorating, coating and colouring techniques and the continuing techniques of light-weighting of glass have retained glass as a preferred packaging medium.

Vitalizing glass as a packaging material – The Challenge to our industry

In the material sector, vitalizing cures have now become big business. Aging Pontiffs, politicians, film stars and other VIPs – or such as they think they are – follow rejuvenating cures.

Why should we not apply the same successful procedure to the vulnerable and rather aged old glass packaging business? Even though it descends historically from the ancient Egyptians, there is no reason to think that it is nothing but an old mummy.

Manufacturers of foods and beverages the world over are rediscovering glass as a packaging material. There are discernible trends which would establish a strong base for glass to be kept as "the most outstanding and desirable packaging materials".

Advantages of Glass Packaging

Glass has a bright, even glowing future. The glass does yield its primacy but as a packaging medium to alternative packaging material especially in the past one decade but at the same time it is winning back some of its lost grounds.

Glass and its fascinating history spanning more than 5000 years

Isn't it fascinating how a glass container – or even a work of art for that matter can originate from a molten gob of glowing glass? But, it is no wonder that the fascination with this creative process has spanned centuries – from the ancient Egyptians some 3000 BC to the 20th century. The fact remains, glass continues to play a vital part in every day life and particularly in packaging applications.

With the advent of glass blowing in 200 B.C. in cities such as Alexandria, which was once reserved only for regal privilege became an indispensable means for goods shipment and decisive factor in promoting trade and commerce.

The advantages of glass as a material are immediately apparent and have been known for centuries. Refined additives have been systematically improved to affect major parameters such as melting point, glass durability and homogeneity of the glass stream, colour and colour consistency. Generations of glass blowers have also made a substantial contribution to the unique reputation of glass. Today, artisans all over the world have raised glass blowing to a fine art.

Flexibility: Glass packaging permits more flexibility in article design and renewal than metal, paper and packaging.

The large number of different shapes, sizes and colours in which glass packaging is to be found in the stores is really remarkable and can still be increased. No other packaging material permits such a broad diversity.

Glass molds being considerably cheaper than tools used for plastic packaging, our industry can easily be more flexible and thus, in this respect glass has an advantage over its competitors.

Recycling: Glass is 100% recyclable. The advantage is that glass being 100% recyclable is a truly environmentally friendly package.

Recyclability is defined as "the re-manufacturing or re-processing of discarded materials into the same product – again, and again and again".

Plastic, on the other hand, when it is recovered, can be reprocessed only once, the second product must eventually be thrown away. But glass never has to enter the waste stream. Part of the problem is the disposal packaging in which consumer goods are sold. Packaging has grown as a percentage of the waste stream considerably.

There are strong environmental and energy consuming forms of packaging. The increasing cost of waste collection and disposal is a major factor, influencing legislation, as Governments try to control expenditure.

In several countries, the glass industry has discovered the benefits of communication, giving emphasis to the advantages of glass as related to nature. Recycling has been a priority for glass manufacturers the world over. For example, across Europe and USA and in several other major glass using countries in Asia, the average recyling rate has gone up to 60% as compared to what it was 10 years ago.

The chances of success for glass obviously lies in its property as a container for natural products. In this respect, one can think of glass packaging for fresh milk, as a typical example, responding well to the new public opinion. Already in 1986, glass packaging has benefited from the chernobyl effect. It is important that we continue to take advantage of it.

Glass is Aseptic: Asepsis is the decisive factor for the future of glass packging. Modern filling processes are based on asepsis. Should we be successful in introducing this procedure in the filling of glass packaging, then, a wide new packaging field will be opened on glass.

Glass as an advertising medium: Non-returnable glass packaging can be labelled appropriately and thus be used as an advertising medium for a great variety of products.

Glass containers can be innovatively used in a number of possible target groups for a new sort of advertising medium. Publicity does not have to be exclusively printed in newspapers or transmitted by TV or Radio. It is also possible to place advertising messages on labels, particularly on foodstuff for every day consumption. The 'daily glass package" is obviously an ideal advertising medium, e.g.

- milk package for corn-flakes
- baby food for pampers
- mineral water for travel agencies
- honey for the protection of landscapes
- exotic fruit-juices for photography etc.
- coffee cream for kitchen equipment
- instant coffee for banking
- pickles for books and records.

Glass is returnable: Without doubt, the increasing awareness of the environmental issues is influencing the development of returnable containers. In various countries, legislation stipulates or is aiming at a future improvement of the existing rates of returnability or is intending to introduce this type of packaging where it has hither been unknown. This development shows that glass is a highly suitable packaging material with vast possibilities.

Glass – A Natural Product: Without doubt, the environmental issue promotes the demand for natural, naturally packaged products. For example, the milk industry in Austria, has raised the demand very drastically, i.e. 0 to 20% of the filling volume and in Italy, there is a rising demand for glass containers for foods and beverages – as opposed to plastic products. The development of low weight glass technology has contributed in making the glass light and convenient.

Although it is a fact that for the time being, glass containers will always be heavier than the comparable plastic or metal products.

Glass is piles of trash and handy: Trash has begun to pile up everywhere, creating serious and expensive problems for cities and towns all over the world. This predicament is known as "The Solid Waste Crisis". Glass Cullet – as broken glass is known – is an input.

Trends in packaging market from food and drinks sector

Health	–	Pure, clean, quality
Diet	–	Does not taint contents
Quality	–	Not just quality image, but quality of design, presentation and supply
	–	additive – free foods; additive – free packaging i.e. glass is pure, inert "chemical" free food processing requirements therefore demands for aseptic packaging systems for glass containers.

Glass is eco-friendly: During the last few years, ecological concerns have gained a new momentum, in almost all the countries either developed or developing. Some spectacular accidents, adding their effects to the "acid rain", or so called, 'disease of our forests', reinforced the general sentiment that more should be done on several fronts.

At first glance, the prospects look excellent for the glass container. As is well known:

- glass containers can be made refillable and their material can be recycled, whether they had been designed as refillable or not,
- whereas other competitive containers for liquids cannot at this stage be refilled, and most of their materials cannot be recycled either practically or economically.

So, we seem to benefit with 2 major advantages from an ecological standpoint.

The refillable bottle looks like the perfect answer to all ecological concerns:

- no waste disposal problem
- excellent conservation of raw materials and energy
- minimal direct and indirect cost for the consumer and the collectors

... but, of course, it must be returned.

The one-way bottle plus efficient recyling looks like the second best answer, behind the refillable bottle, but far ahead of the other materials, an elegant answer to the waste disposal problem, a good conservation of raw-materials, a sound economic basis ... and it does not have the return system constraint.

Moreover, both products are bio-degradable, chemically safe and they can be produced and recycled economically in good environmental conditions. The raw materials needed are available in abundance. We have good flexibility among energy sources: oil, gas and electricity.

Glass packaging – more than just a packaging solution

As a material, glass has outstanding properties, and its advantages have been successfully harnessed by innovative Glass Plants to further promote its competitive edge. Highly original packaging concepts bolster the uniqueness of a product, and hence, its image whatever your packaging demands.

Glass can provide the solution to your needs because of the high flexibility it lends to container design.

Coloured Glass significantly extends the range of container design possibilities. Every good packaging design makes a given product much more distinctive.

Strengths of glass packaging

Consumption, behaviour and volume will be mainly determined by social conception of values in future.

Regarding packaging, this will mean that:

- materials which do not pollute the environment,
- pleasant and attractive packaging which appeals to the feelings will have preference
- the contents of many containers will be smaller
- the change of models in packaging will be accelerated.

Glass is the only packaging material which almost entirely fills these requirements. They are of great importance to us, because from them we deduce the future prospects of glass packaging.

We believe in the future of the glass packaging that glass – in comparison to competitive materials – possesses the following relatively strong points:

- Glass is flexible and renewable because its shape can be changed without unreasonable cost and the product can be given a new appearance at relatively short intervals.
- Glass is economical because it permits high filling line speeds and can also be produced economically in smaller series.
- Glass is bio-cybernetical because it can be re-treated (recycled) and can be used again (re-usable).
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The most prominent forms of glass packaging for the food and drinks industry are the wide-mouth food jars and the glass bottles.

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In addition to various design possibilities Glass has numerous Key Properties and Major Advantages:

* Natural, immediately recognizable product
* Appealing material
* Pressure-resistant
* Inexpensive
* Re-usable
* Recyclable
* Environmentally safe
* Numerous cap and closure possibilities
* Will not oxidize in a damp environment
* Will not affect the taste or smell of the field product
* Hermetic sealing properties
* Sterile and aseptic
* Ovenproof
* Long shelf life
* High chemical resistance
* Highly aesthetic
* Multiple colour variations
* Antistatic
* Numerous container design possibilities
* Impervious to ambient temperature fluctuations; no shrinking or bloating of the container shape.

- Recent market trends have created a climate for continued growth opportunities with glass, which would not have been expected a decade or so ago when the material's future in packaging was under serious threat.
- Longer working hours, less shopping time in supermarkets, media fragmentation increased impulse purchasing paterns and the increasing need for products to offer something different and to stand out – all point to more marketing focus at the point of sale and especially the need for packages that differentiate products. Glass holds a highly favourable position in terms of making a product look distinctive. The transparency of glass itself promotes the products and labels and other decorating techniques can enhance this. The weight of glass, inspite of being a drawback in terms of distribution costs, also conveys a quality image that consumers recognise. The traditional qualities of glass, that looked set to make the formal redundant in the mainstream a decade ago, are now the very same qualities that are maintaining the usage of the material. Further, the recyclability of glass has become a major factor and will continue to do so, in the determination of the packaging formats.
- As the population grows in wealth, it will seek better products rather than cheaper ones. People will go for branded products and they associate glass with quality.
- The obvious advantages of glass as a packaging material need not be stressed – we will know them. People like glass.
- Another benefit of glass comes from health consciousness. Rumours abound. Aluminium causes Alzheimer's disease. Plastic causes cancer. Cartons contain dioxins. Newspaper headlines scream sensational messages. They do not have to be right but only half-believed. But they are hard placed to find anything against glass. Here again, glass wins hands down. There is an argument saying that the polluter must pay.
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- Awareness of packaging on the part of the consumer, whereby three trends are discrenible
- A general malaise is projected into packaging owing to the period we are living in. Packaging has fallen into the role of a scapegoat.
- On the other hand, packaging poses concrete problems to the consumer, e.g. inconvenience regarding waste disposal, an idea that it raises the price of products, that it means squandering of energy, that it pollutes the environment etc.
- The consumer values modern packaging because it offers convenience, which is a kind of comfort.
- Of special importance to us is the fact that the consumer has acquired a better awareness of the environment. His latent wish is therefore to show a behaviour more useful of the environment.

Advantages of Glass Packaging

A. Flexibility, B. Recycling, C. Glass is Aseptic, D. Glass as an advertising medium, E. Glass is returnable, F. Glass – a Natural Product, G. Glassispiles of trash and handy, H. Glass is eco-friendly.

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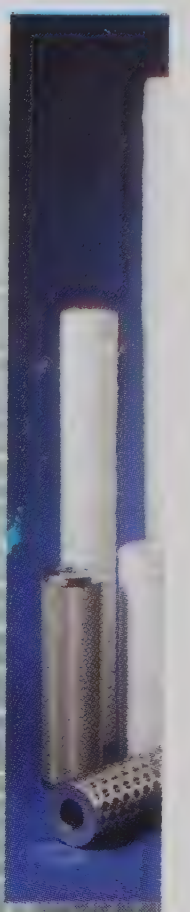

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Regarding packaging, this will mean that:

- materials which do not pollute the environment,
- pleasant and attractive packaging which appeals to the feelings will have preference
- the contents of many containers will be smaller
- the change of models in packaging will be accelerated.

Glass is the only packaging material which almost entirely fills these requirements. They are of great importance to us, because from them we deduce the future prospects of glass packaging.

We believe in the future of the glass packaging that glass – in comparison to competitive materials – possesses the following relatively strong points:

- Glass is flexible and renewable because its shape can be changed without unreasonable cost and the product can be given a new appearance at relatively short intervals.
- Glass is economical because it permits high filling line speeds and can also be produced economically in smaller series.
- Glass is bio-cybernetical because it can be re-treated (recycled) and can be used again (re-usable).
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BEVERAGE & FOOD WORLD

CONTENTS

"Beverage & Food World" purveys information on processed foods & beverage products & processes manufactured in India. Every issue carries articles/ research papers by leading food scientists & technologists, and some of the Special issues carry a Buyers' Guide to locate suppliers of equipment & ancillaries, raw materials, etc. which are used in the manufacture of processed food & beverage products. Regular features include 'Trade News & Notes', 'Company News', 'Export Opportunities', 'Product Reviews', 'International Trade Fairs & Conferences', and 'Book Reviews'.

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Machinery/Equipment for Food Processing in Small-Scale Industry

by
Dr. D. R. Bongirwar, K.K.V. Nair and K.B. Patil

During its conversion from raw state to usable state, food material passes through two distinctly different processing stages. Primary processing refers to those rather compulsory, basic operations which convert foods into a form fit for eating or use in subsequent processing. Most of them are industrial operations. Some examples are: (a) milling of paddy into rice and husk, (b) milling of wheat into coarse and fine flour, (c) production of sugar from sugar cane, etc. Secondary operations come next and they are the processes that convert primary processed food into a form fit for use in homes, canteens and hotels. Consumption of preprocessed foods in India is gradually on the increase, but still at very low levels. High costs, diverse food habits and rigid preferences regarding aroma and texture for the product have been the reasons for the low consumption of processed foods. Some examples are: (a) milling of rice into rice flour, (b) wheat flour into bread and biscuits, (c) production of alcohol and sugar confectionery, etc. There is a third-stage mix - tertiary processing, which refers to the actual preparation of the food for eating, and this is carried out mainly in homes and hotels. Some examples are: (a) cooking of rice and meal preparation, (b) preparation of snacks, breakfast and sweet dishes, (c) preparation of coffee, tea, beverages, etc.

Plant machinery/equipment availability, efficiency and costs, play a vital role in the development of any industry

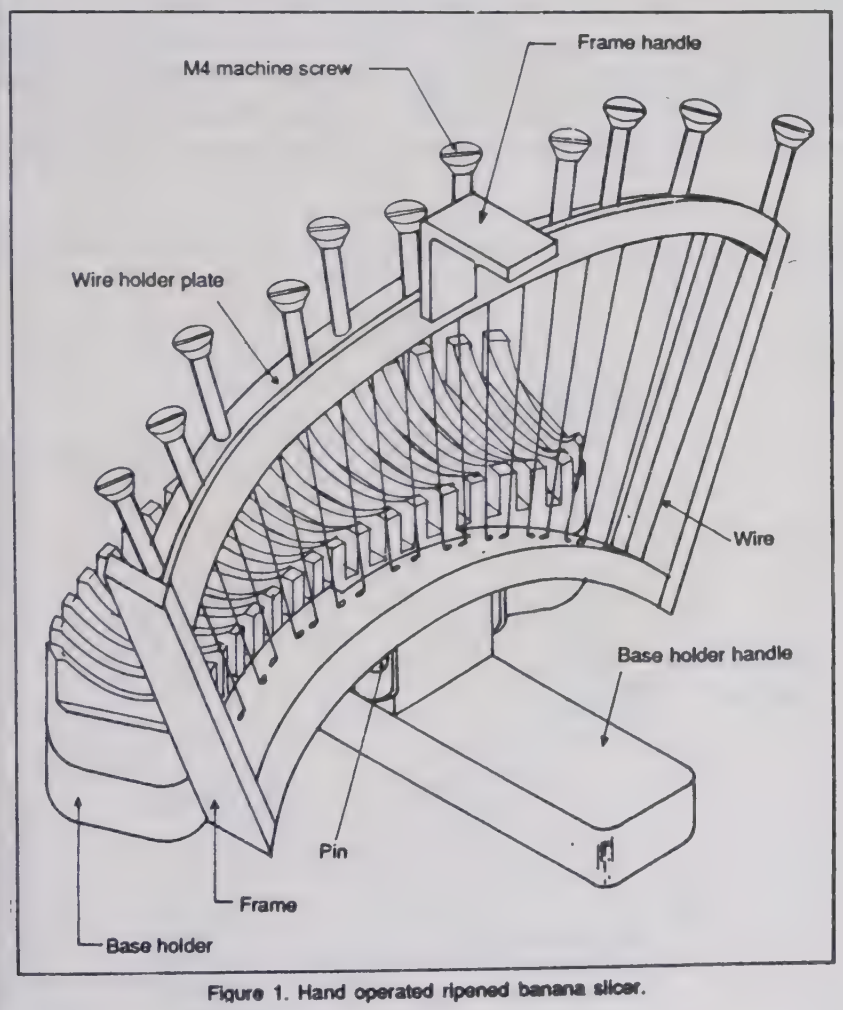

Figure 1. Hand operated ripened banana slicer.

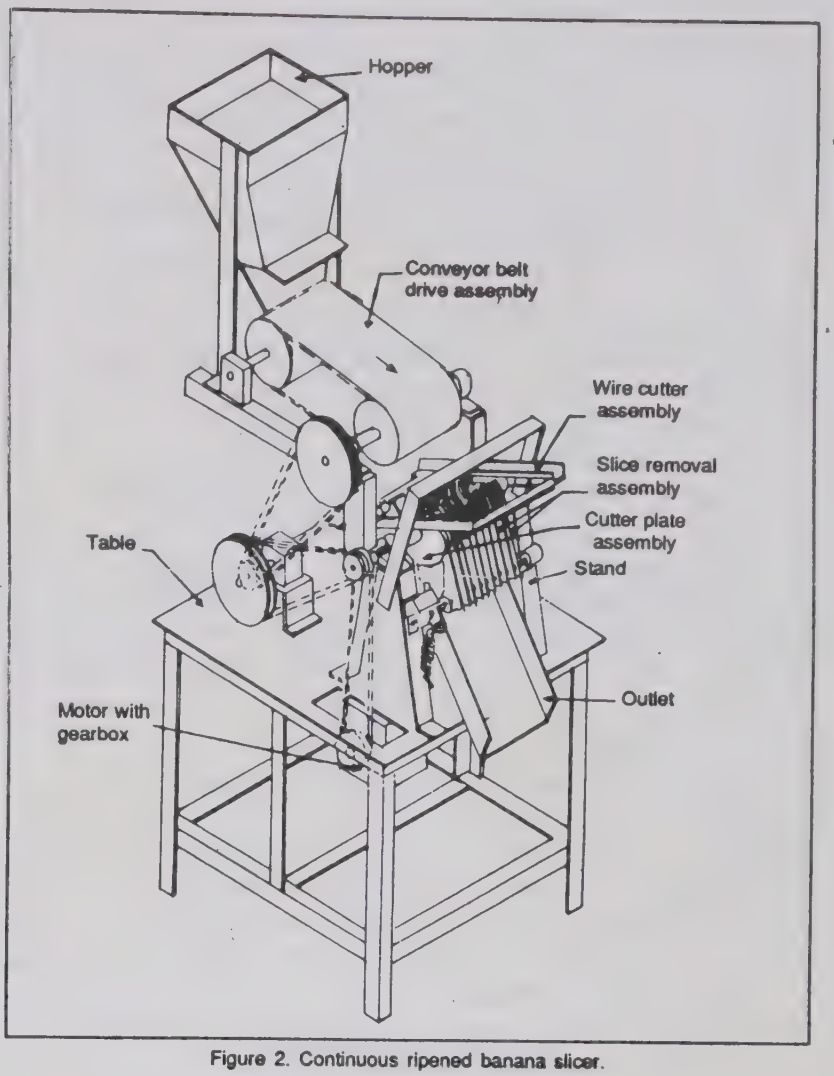

Figure 2. Continuous ripened banana slicer.

and it is very much so in case of food processing also. Design of equipment for food processing involves consideration of parameters often different from other processing industries. Interaction of products and materials of construction is an important factor. The designer must be aware of the product and process needs. The equipment designs must match the product and processing demands. Abrasiveness, fragility, density, size and shape, corrosive properties of both construction material and food product, flow velocities and characteristics, pH, state of product and ease of contamination all are factors that need study.

Hygienic design assumes greater importance in case of food plant machinery/equipment than any other factors. Hygienic design encompasses four important spheres of activity in the design and fabrication of these equipments. They are: a) selection of the right construction materials; b) actual design of the machine; c) construction and fabrication methods, and; d) surface finishes.

The basic objective underlining the hygienic design is that the machine itself should not contribute to microbial or other types of contamination or spoilage of the food. Several international standards have been evolved in order to achieve the basic requirement. The features that these standards insist upon are: a) food contacting surfaces should be inert to food under all conditions of use; b) surfaces must be smooth and not allow tiny food particles and bacteria to get deposited in the microscopic surface crevices; c) even internal surfaces should be visible for

Dr. D.R. Bongirwar, Head, K.K.V. Nair, Scientific Officer (Engineer), and K.B. Patil, Senior Draftsman, Food Engg Services Section, Food Technology & Enzyme Engg Div., BARC, Trombay, Bombay 400 085

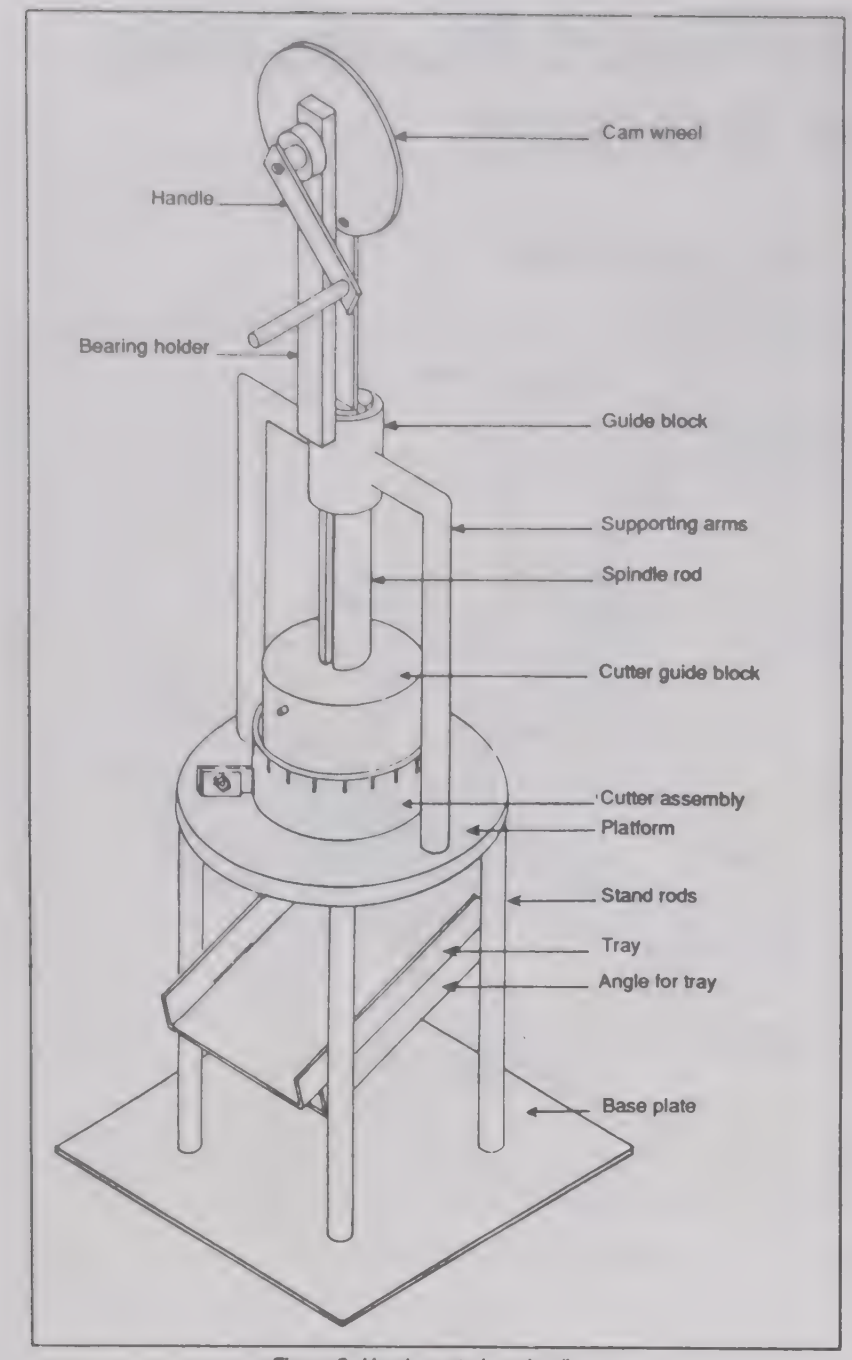

Figure 3. Hand operted apple slicer.

inspection and cleaning, d) design must faciliate easy dismantling of parts for cleaning and inspection; e) providing lids and other protection to prevent external contamination, and; f) avoiding sharp corners and crevices, which harbour microbes, difficult to dislodge by normal cleaning.

Indian Scenario

Machinery/equipment needs of the food industry in India is at present met by the following categories of equipment manufacturers.

1) Dairy machinery manufacturers, most of them, with foreign technology and design back-up. They also serve the requirement of fruit juice processing industries.

2) Chemical process machinery manufacturers with both indigenous and foreign know-how. These machines cannot be directly adopted in the food industry.

3) Specialist manufacturers in selected areas like sugar manufacture, paddy processing and solvent extraction, who cater mainly to the primary processing sector.

4) A few fabricators in the small scale sector, with indigenous knowhow, who have evolved their own design over the years.

None of these manufacturers are engaged in development of new plant/equipment for R & D work and large scale processing as per requirements.

Besides in-house R&D groups of some major industries, there are several Government agencies engaged in development of food plant machinery/equipment. Over the years, several equipment designs have been worked out and perfected through prototype fabrication and factory trials. Some equipment designed and fabricated at Food Technology & Enzyme Engg Div, BARC, Bombay, for R&D needs have been described here with their sketches which find use in food processing operations to a great extent. These are as follows:

1. Hand operated banana slicer
2. Continuous ripened banana slicer
3. Hand Operated apple slicer
4. Mango pulper
5. Metal can lid opener
6. Fish pressing machine
7. Fish laminating machine
8. Fish meat picking machine
9. Steam jacketed rotary dryer
10. Ice crusher
11. Ice cube/flake machine
12. Peas deshelling machine
13. Experimental bean cooker
14. 25 kg foldable solar dryer and 100 kg capacity solar dryer
15. Hand operated groundnut decorticator
16. Roaster for peanuts or soyabeans, and
17. Animal diet grinding machine

Hand Operated Banana Slicer

In fruit processing industry when large scale fruits are to be cut and further processed either by drying, freezing or canning, fruits are to be deskinned, sliced, blanched and then processed. Slicing of fruits plays an important role in quality control and if slicing is done by the machine, it is considered to be very good. Considering these aspects and for R&D work, viz., processing of fruits by osmotic dehydration it was felt that on lab scale and then large processing, hand operated fruit slicing units could be developed, as per which this equipment was designed and fabricated in the divisional workshop which was found to be quite handy and very useful. The unit as shown in Figure 1 consists of a base holder of stainless steel or Perspex material and it is hinged with a frame made out of SS or Perspex which contains stainless steel wires at a distance

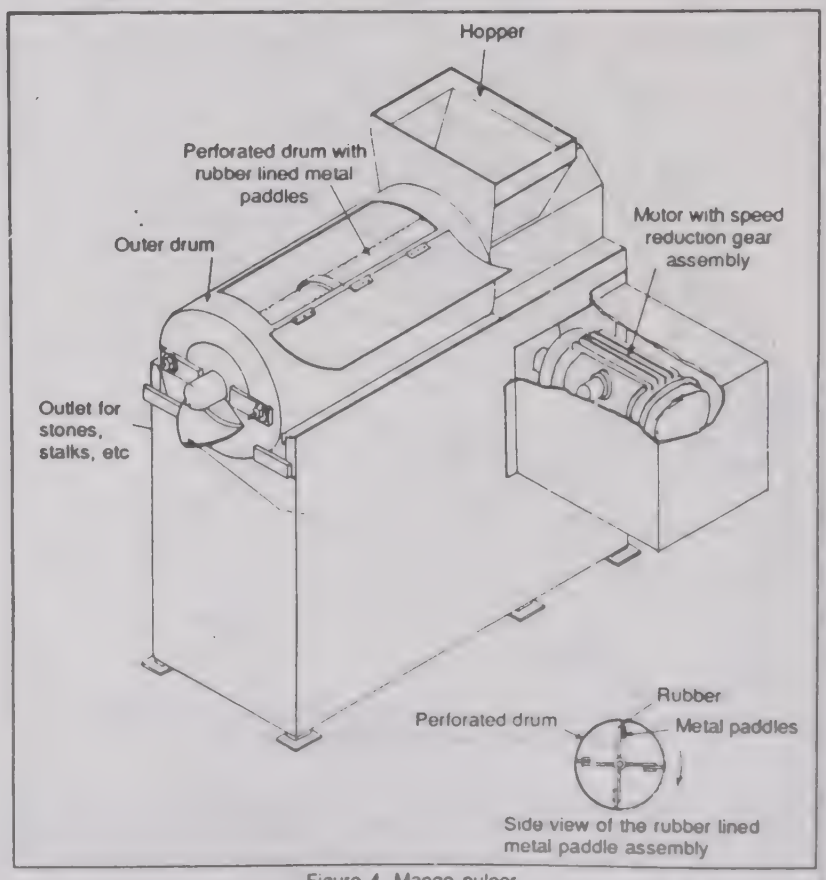

Figure 4. Mango pulper.

2 to 3 mm in tight conditions with wire holder plate and htening screw arrangement. The ripened banana to be ced in uniform slices of 2 to 3 mm is put on the base lder frame with grooves and the hinged portion of the wire lder plate is pressed, and just by applying little pressure hand, slices of bananas are produced. Operation is very mple and within one hour more than 200 to 300 bananas uld be sliced by one person. The same unit could be used slicing of other vegetables, viz., radish or cucumber. n-line, along the conveyor belt, personnel can sit with ese units and slicing operation could be done speedily. parts coming into contact with the fruits/vegetables are ade of stainless steel.

ntinuous Ripe Banana Slicer

the basis of successful operation of hand operated nana slicer attempts were made to fabricate continuous e banana slicer. The details of machine could be seen in gure 2. The machine consists of following parts: (1) pper fitted with conveyor assembly (2) wire cutter sembly in which stainless steel wires are tightened in a me at spacings of 2 to 3 mm (slice thickness) (3) cutter te and slice removal assembly (4) stand to allow mounting above assemblies, and (5) drive motors and gearboxes. Deskinned ripe bananas are put in the hopper, more than to 30 at a time. The slope in the hopper allows bananas move on the rubber conveyor in the grooves, and in the re cutter assembly they get sliced and the removal sembly takes the slices out via the outlet chute. The ce removal and cutter plate assemblies are driven slowly a motor with gearbox while wire cutter assembly and nveyor drive assembly are driven together. All parts, ., hopper, framework of wire and cutter assemblies and ce removal arrangement are made of stainless steel. is slicer has been found to be very handy for large scale ocessing of ripened banana slices by osmotic dehydra- n or freeze drying or any other drying. In hotels and nteens it could be used for the preparation of fruit salads d other items.

nd Operated Apple Slice

ple slicing during processing operations plays an portant role in maintaining the slice thickness of the fruit iformly to a great extent and, as a result further ocessing, viz., drying or freezing takes place properly. maintain uniform and proper thickness of apple slices a mple unit, viz., hand operated apple slicer was designed

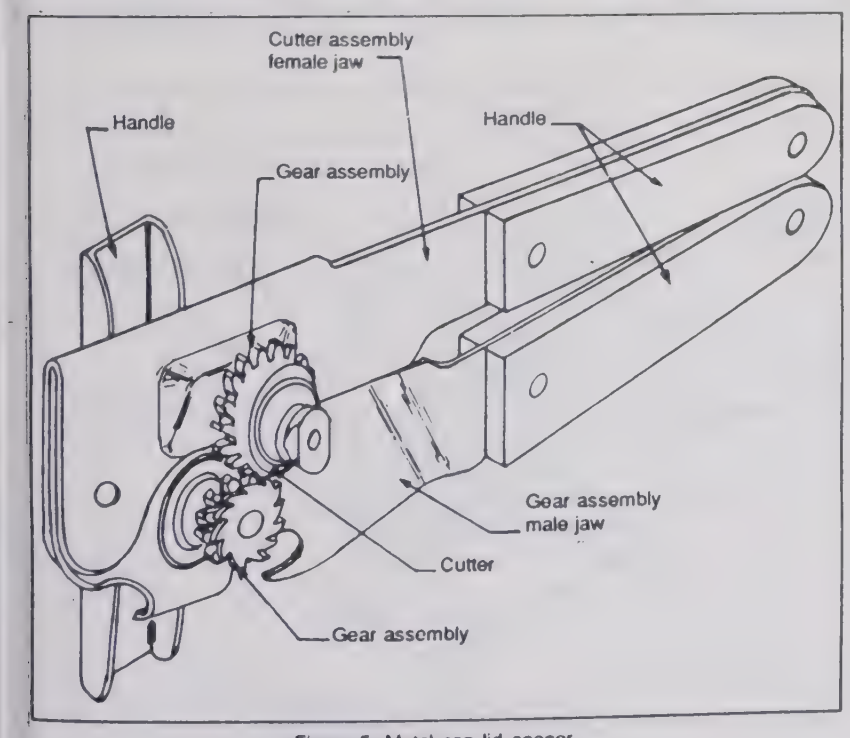

Figure 5. Metal can lid opener.

and fabricated. The details of the unit are shown in Figure 3 which consists of a base frame cutter assembly, cutter guide block supporting arms and cam wheel assembly for drive. Washed apples are pierced in the centre by stainless steel cork which covers hard portion of fruit which is difficult for slicing. This operation also helps to keep the fruit in central position during slicing. Apples are then kept one by one on cutter assembly which has sharp stainless steel knives fitted at uniform distances. The cutter guide block is then moved with cam wheel assembly in such a way that apple gets pressed between the knives and cutter guide block. The apple slices are collected in the tray for further processing. The movement of cam wheel assembly could be mechanised for large scale processing.

Mango Pulper

To increase the shelf life of mango pulp for long time, high temperature short time treatment was attempted on semi-pilot scale. For undertaking this work, a mango pulper was designed and fabricated in the divisional workshop as shown in Figure 4. The mango pulper mostly made out of stainless steel parts, consists of hopper, SS perforated drum with rubber lined metal paddles assembly motor with speed reduction gear assembly and out lets for stones and stalks and for pulp. Ripened Alphonso mangoes for pulping are fed through the hopper in a perforated drum which is rotated by the motor with speed reduction gear assembly. In the drum, rubber lined metal paddles squeeze and press the mangoes continuously in such a way that all the pulp from mangoes starts coming out through the perforated drum which is collected in a barrel via outlet. Stones and stalks of mangoes will come out from the other end of the perforated drum. Once the pulping operation is completed, continuous feeding of mangoes through the hopper could be done by allowing some time gap for efficient pulping operation, as a result choking will not take place and pulping operation will not be disrupted. The pulper has been found to be very useful for taking pulp from all varieties of mangoes and besides this the same pulper with little modifications could be used for taking out juice from oranges or lemons as the case may be. About 50 to 60 dozens of mangoes could be processed within half an hour using this unit. For large or commercial scale processing, the dimensions of the unit could be modified and higher HP motor with speed reduction gear assembly could be fitted. With the help of this unit, entire operation of pulping could be done without touching the fruits by hands and hence problem of contamination will not arise and the quality of pulp obtained is good and hygienic. As a result further processing of pulp becomes less problematic.

Metal Can Lid Opener

An improved version of hand operated metal can lid opener was fabricated for ease of operation and increasing the speed of workers to open the metal can lids quickly for analysis purposes in the laboratories as and when required. The unit shown in Figure 5 consists of a handle, cutter assembly with male and female jaws, sharp teeth cutter, and gear assembly for drive with handle. The metal can whose lid is to be opened is pierced by the lid opener's cutter teeth at one end with the can resting on a table or gripped in the palm of the hand. Right hand is used for operating the handle with cutter gear assembly which moves along the circumference of metal can and starts cutting the metal lid off the can surface in a circular motion. Operator has to hold the can and operate only the handle for opening the metal can. More than 80 to 90 cans per hour could be opened using this lid opener. All the cutter materials used are of high carbon steel.

Fish Pressing Machine

For preservation and processing of fish, Bombay duck, by radiation it was found that fish in pressed condition could stay for 1 to 2 weeks more than normal storage time due to dripping which will occur during pressing. In order to press more than 12 to 15 pieces at one time, a simple fish pressing machine was designed and fabricated in the divisional workshop (Figure 6). The machine consists of a stand, gearbox with screw structure assembly for movement of the plate, rotating wheel for operation and movement of metal plate for pressing, tray with outlet for drip collection and stainless steel lined metal plate to hold the fish for pressing. Before starting the operation entire unit is thoroughly cleaned with soap solution and then with hot water. Bombay duck, 15 to 18 in number, is lined up for pressing on the SS clad metal plate which is placed exactly below the moving plate for pressing.

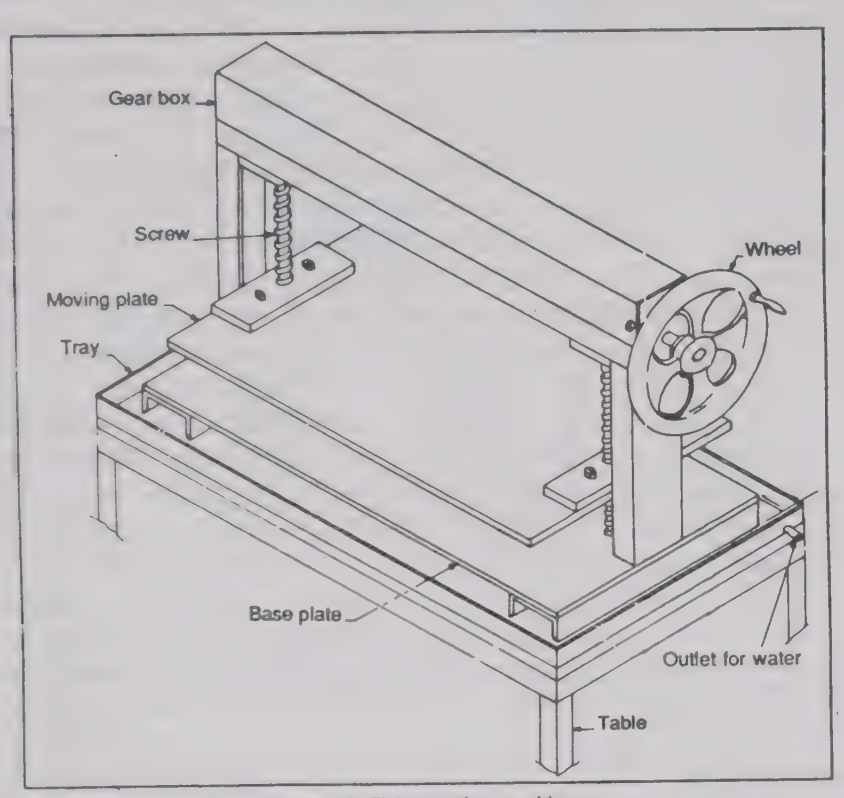

Figure 6. Fish pressing machine.

By operating the wheel handle assembly in anticlockwise direction the moving plate fitted with screwdrive and gear assembly will start coming down on the fish, and press the mass. The pressing operation is then carried out till all the fish become flat in shape. The plate is then locked for 3 to 5 minutes till most of the drip losses take place which could be seen physically. Once the dripping stops, the operation is complete and the fish could be further processed or stored as the case may be. The machine has been found to be very handy in R&D work and could be improved upon for commercial scale processing.

Fish Laminating Machine

In case of dried fish preservation, to maintain quality and taste attributes including texture, fish lamination and then artificial drying or solar drying have been found to be very useful. For making fish lamination easily on small scale with simple machine it was felt that unit could be designed and fabricated easily as shown in Figure 7. It consists of a base plate, rollers lined with stainless steel sheet, a giant wheel for operation of the rollers which are driven by gears, a sliding block for adjusting the gap between the rollers, and side plates to allow the operation to take place in a confined area. Depending on the thickness of the fish, the distance between the rollers could be adjusted. Initially, fish to be sent for lamination before artificial drying or sun drying is allowed to be passed freely between the rollers then depending upon the thickness of the fish lamination

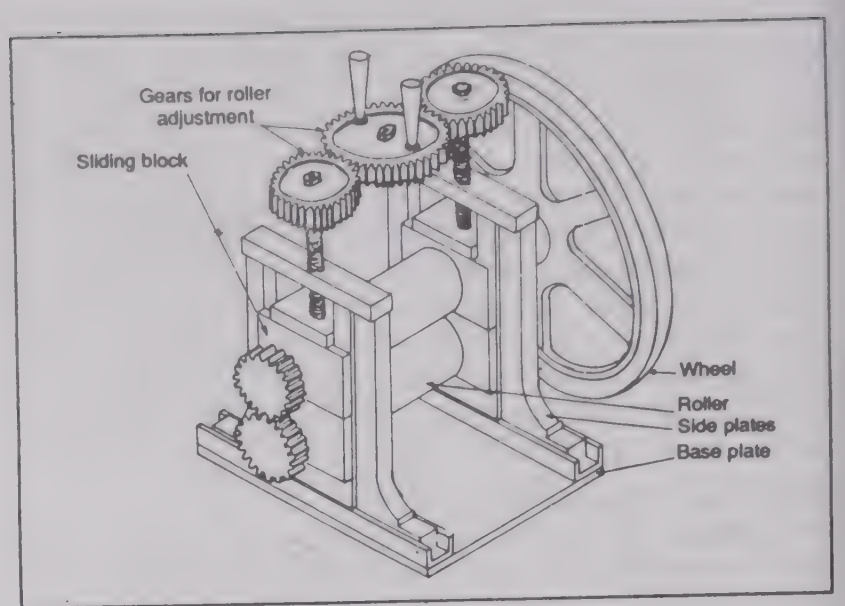

Figure 7. Fish laminating machine.

desired, distance between the rollers is adjusted by a sliding block. By passing the fish between the rollers 2 to 3 times, a good lamination of individual fish pieces could be obtained. Once the fish is laminated, it could be dried faster, as more surface area is available for heat transfer and drying occurs faster, as a result browning and other reactions will not occur. Quality of fish could be improved to a great extent after drying. About 500 pieces of fish could be laminated within 1 hour using this machine which otherwise would require 6 hours if done manually. Even semi-dried fish could be laminated using this machine and in case of Bombay duck fish processing, this unit could be extensively used by fishermen for extra income and good quality product outlet.

Fish Meat Picking Machine

For trash fish utilisation and making meat balls and other meat preparation from fish muscle portion, this machine has been found to be very useful. The meat portion from the fish mass is picked hygienically without being touched by hand, as a result quality of meat or muscle portion picked from fish surface will be very good. The machine is shown in Figure 8. Its operating principle is as follows: Trash fish or fish from which meat or muscle portion is to be separated from skin and bone are fed into the hopper of the machine. Due to slant in the hopper the mass traverses on the conveyor belt which is pressed by a SS perforated drum. Inside this, to rub the perforated portion of the drum, a scraper type screw conveyor is driven by motor with speed reduction gear which will take out the pressed meat o

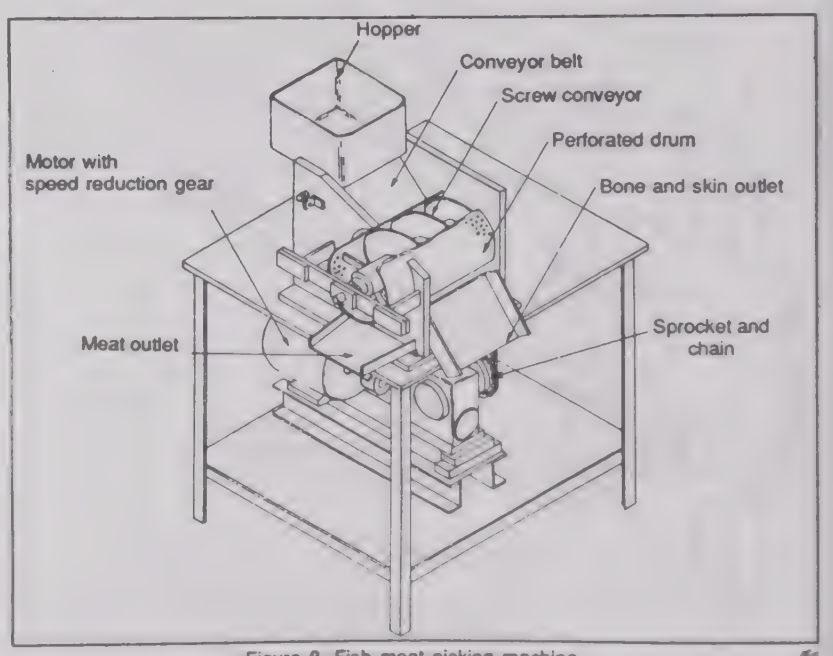

Figure 8. Fish meat picking machine.

muscle portion of the fish. As a result of continuous running, all the meat or muscle portion of the fish could be picked up separately and bones and skin of the fish could be removed independently. About 5 to 10 kg of fish could be processed by this machine within 15 minutes; manually the same operation may take about 3 to 4 hours. All parts of machine coming in direct contact with the food are made from SS and for conveyor, food grade rubber material is used. The same machine could be used for removing meat portion from thick fish but then distance between conveyor and perforated drum surfaces will have to be adjusted.

Steam Jacketed Rotary Dryer

For preparation of good quality semi-dried precooked shrimps which could be stored for a long time, a steam jacketed rotary dryer for laboratory scale trials was conceived and fabricated in the divisional workshop. The unit shown in Figure 9 consists of a steam jacketed rotary drum with inlet/outlet mounted on a base of frame with stand, exhaust fan for removing moisture from the rotary steam jacketed drum, steam rotary joint, speed reduction gear assembly with motor for drive of rotary drum, pressure gauge, steam safety valve and steam inlet. The main advantage of steam jacketed rotary dryer lies in the fact that drying of shrimp under controlled condition and with uniformity of heat distribution could be achieved in a short time which allows the precooked shrimps to dry in a proper manner. Shrimps after cleaning, washing and proper cooking are fed inside the rotary drum via feed inlet. The entry of steam into the rotary drum is controlled depending upon the temperature required. As soon as the product enters and heating starts, exhaust fan is started and the product is allowed to rotate in the steam jacketed drum at very slow speed for a period of 2 to 3 hours. Moisture content in the semi-dried pre-cooked shrimps of 20 to 25% could be obtained within 3 hours and by using this unit further reduction in the moisture content could be achieved if the dryer is operated for more time. Quality of product obtained using this unit is very good and about 2 to 5 kg of product could be processed at one time. The same unit could be scaled up to a large size depending upon the requirement.

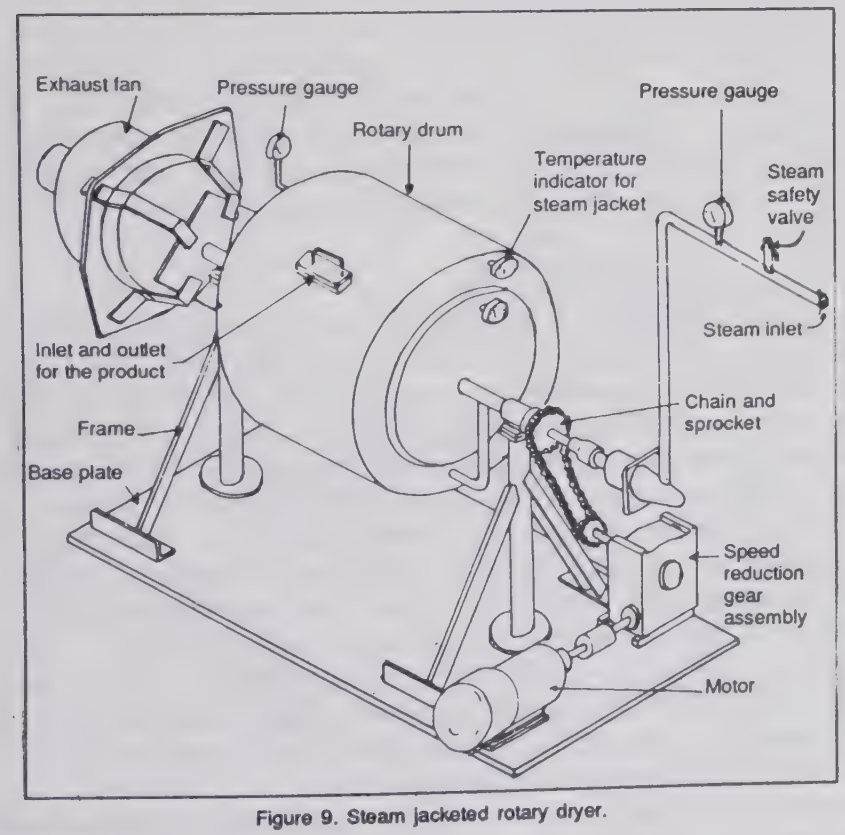

Figure 9. Steam jacketed rotary dryer.

Ice Crusher

During food processing, fish or meat processing or even in canteens, homes and restaurants, need of crushed ice is more area and in the crushed form ice can cool the product instantly. Availability of crushed ice in hygienic form without hammering it by hand or touching is preferred by food industry as contamination could be reduced. At present in food industries, ice in the form of large and huge cans is available for processing but then simple gadgets for crushing such blocks of ice are not easily available. Considering this requirement, an ice crusher as shown in Figure 10 was designed and fabricated. The unit consists of a hopper for ice block or can size ice, crusher, outlet for crushed ice, motor for driving the cutter, and frame and base plate

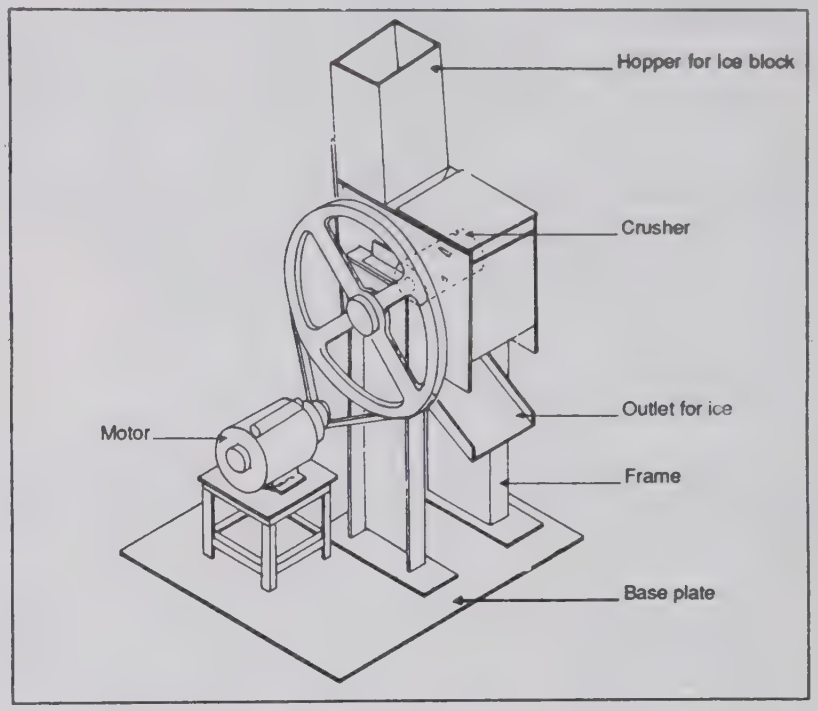

Figure 10. Ice crusher.

Ice block or ice can to be crushed is slid in the hopper and as the hopper is designed with an inclination, the block will remain in inclined position. Below the hopper, a heavy duty crusher is operated by a motor. As the inclined portion of ice block keeps sliding down due to its weight, it comes in contact with pointed pins of the crusher which keeps on crushing the ice to small pieces as more than 32 pins are fitted in the crusher. For crushing a 20 kg ice block the machine takes less than 3 minutes. The operation is very simple and the personnel have to only lift the ice block from the machines and put it in the hopper. All parts coming into contact with ice are made from aluminium.

Ice Flake/Cube Machines

Food industry also needs flake/cube ice for handling of fish and meat, chilling of vegetables, milk and milk products either for storage for short durations or during transportation of these perishables. Currently flake/cube ice machine of 1 to 2 kg/hr. are not available. Attempt was therefore made to design and fabricate a small lab scale ice flake/cube machine incorporating water cooling condenser in the design and F-12 refrigerant compressor. The machine is found to be suitable for continuous use and could be fabricated at reasonable cost.

Figure 11 shows essentially a thermocole lined insulated chamber for storage of flake ice or cube ice with arrangements for controlling the level of accumulated flake/cube ice at different heights; the housing for refrigeration system consisting of motor driven gear, auger assembly or assembly with sloping tray divided into layers of ice strip below which as SS wire mesh grid to get ice cut into cube size could be installed; and condenser, fan motor, waterfloat chamber with control switches, thermostats, water circulating pump and drain connections, etc. The

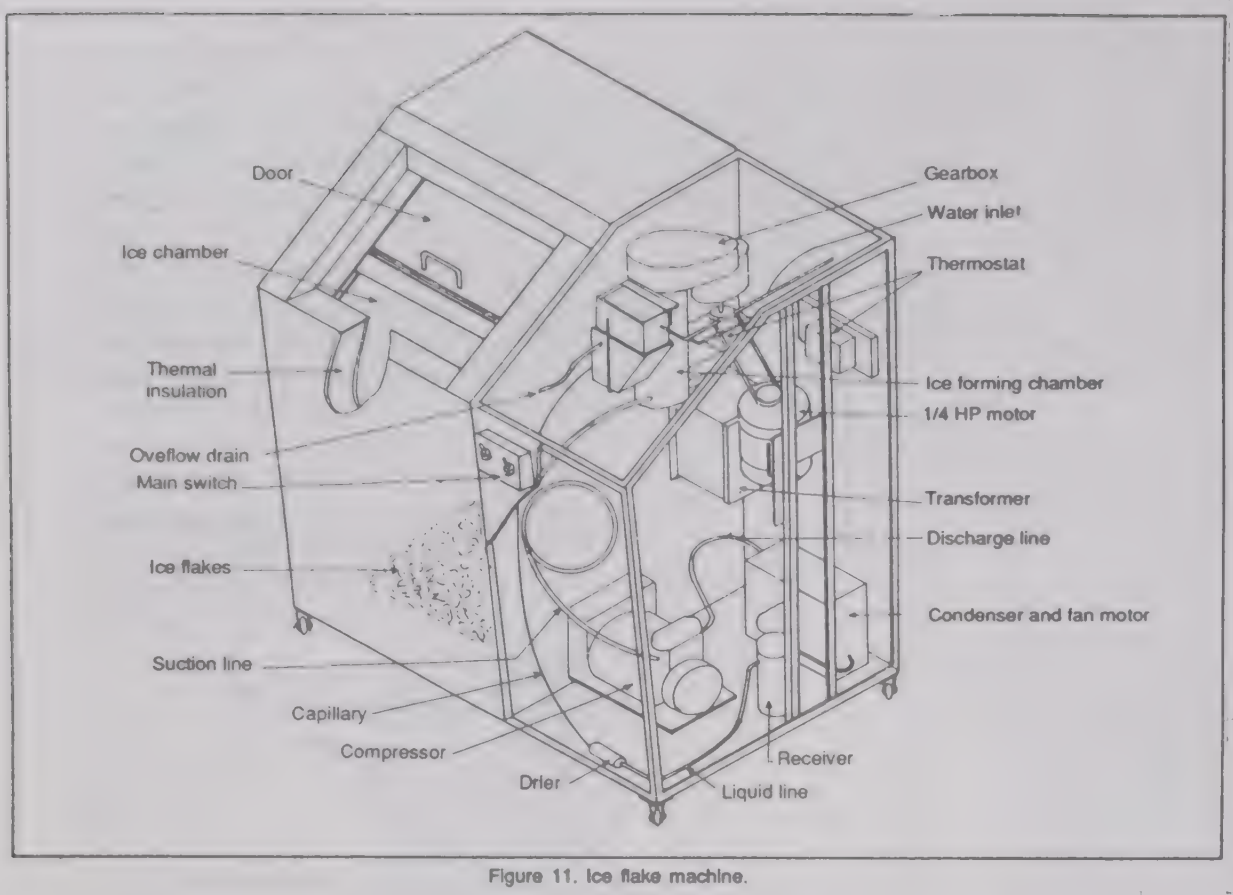

Figure 11. Ice flake machine.

water line connected to the machine's float chamber assembly is controlled. Water will not flow through the cooling condenser until the machine is started electrically. The compressor and drive motor could operate continuously until the bin is full. The machine was adjusted and tested at the laboratory so that no further adjustment was necessary. The refrigerant circulated around the freezer tube freezes ice on the surface of the tube. A heavy duty auger is provided in the tube to break the ice loose and to force out the flakes. The drive motor bearing should be oiled once in a year while condenser fan motor needs frequent oiling. The entire process of obtaining flake/cube ice prevents contamination since it is untouched by human hands. Cost of production of such small scale units could be reduced if produced on commercial scale.

Peas Deshelling Machine

For deshelling of green peas on large scale in semi-pilot scale, it was felt that the operation could be performed by the machine instead of pressing the pea pods by hand and reducing the contamination. A small machine shown in Figure 12 designed and fabricated in the workshop works on the following principle: Green peas pods are put in the hopper which is fitted with slanted aluminium tray fixed with channels. Peas pods go through these channels by gravity to the outlets. They are then allowed to get sandwiched or pressed between rubber lined rollers in such a way that pressure exerted by these rollers is sufficient to deshell the peas from the pods and peas along with shells can fall on a wire mesh cover plate which allows peas and shells to be collected separately. By the reduction gear motor, speed of operation could be adjusted depending upon the thickness of peas pods and accordingly distance between the rollers can also be changed. More than 3 to 5 kg of pea pods could be deshelled within 10 minute which may take about 1 hour if done manually even by 3 to 4 perons. As the working principle and operation of the machine is very simple, scaling the size as per requirement for large scale application could be done easily.

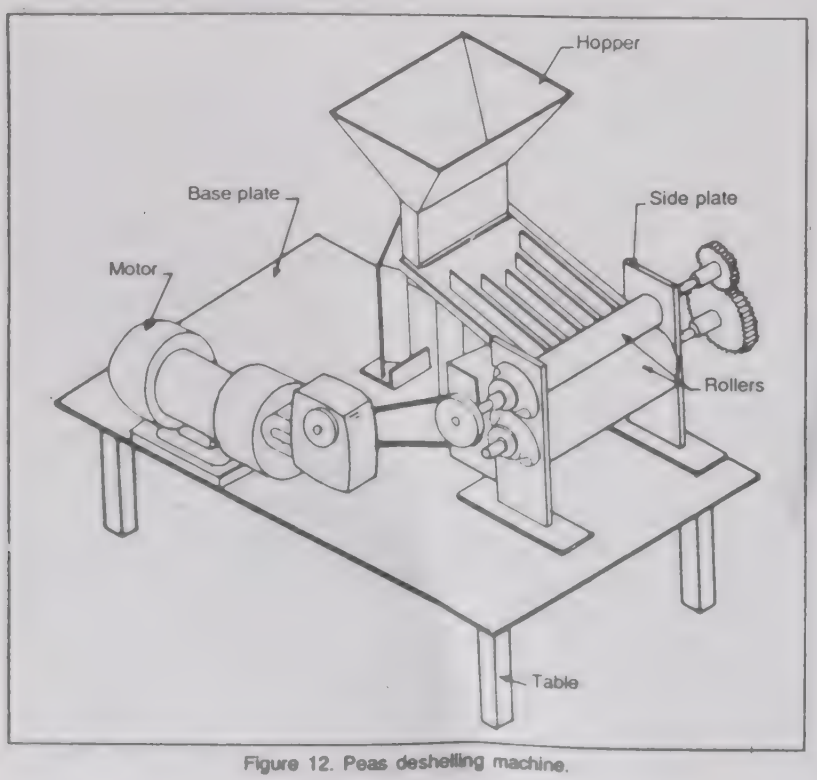

Figure 12. Peas deshelling machine.

Experimental Bean Cooker Unit

For determining the cooking time of peas or cereals and other commodities in hot boiling water a simple unit shown in Figure 13 was fabricated in the workshop. Peas or cereals whose cooking time is to be determined are taken in 100 numbers and placed in the peas holder plate. The entire assembly of cooker with frame, guide plate for plunger stationary plate, etc, are submerged in a bath in which water is boiling. The peas in the peas holder plate are held by a known weight plunger which rests on in a guide plate so even due to water boiling, peas will not get distrubed and fly away. As soon as the peas get softened each plunger resting on peas with weight and a needle starts making sounds as it goes on piercing the soft cooked peas surface and touches the peas holder plate. After all the plungers pierce the peas and rest on the plate, time elapsed in counted which gives the cooking time of peas. The apparatus is found to be very simple and easy in operation for determining the cooking time of peas. For the production of quick cooking dehydrated peas and determining their cooking time with respect to fresh peas or commercially dehydrated peas, this unit has been found to be very useful.

Foldable Solar Dryers

Proper conservation of perishable agricultural produce can lead to considerable economic gain for both the small farmers and the overall economy. More so, if the method uses an alternate source of energy such as solar energy where cost involved in processing is negligible. Dehydration of agricultural commodities is an important means of conserving food. It can effectively conserve the produce during glut period and make it available throughout the year at reasonable cost. As a result marketing and transportation of the product becomes convenient and efficient.

For these, simple, efficient and affordable solar dryers of 10, 25 and 100 kg capacities have been developed. Cost of 10 and 25 kg capacity dryers have been fixed at Rs 2,500 and Rs 5,200 respectively exclusive of packaging and transportation costs. More than 36 numbers of dryers have been sold by FTEE Division to various farmers, traders and R&D institutions in the Maharashtra and neighbouring states. The dryer when displayed in Energy India Exhibi-

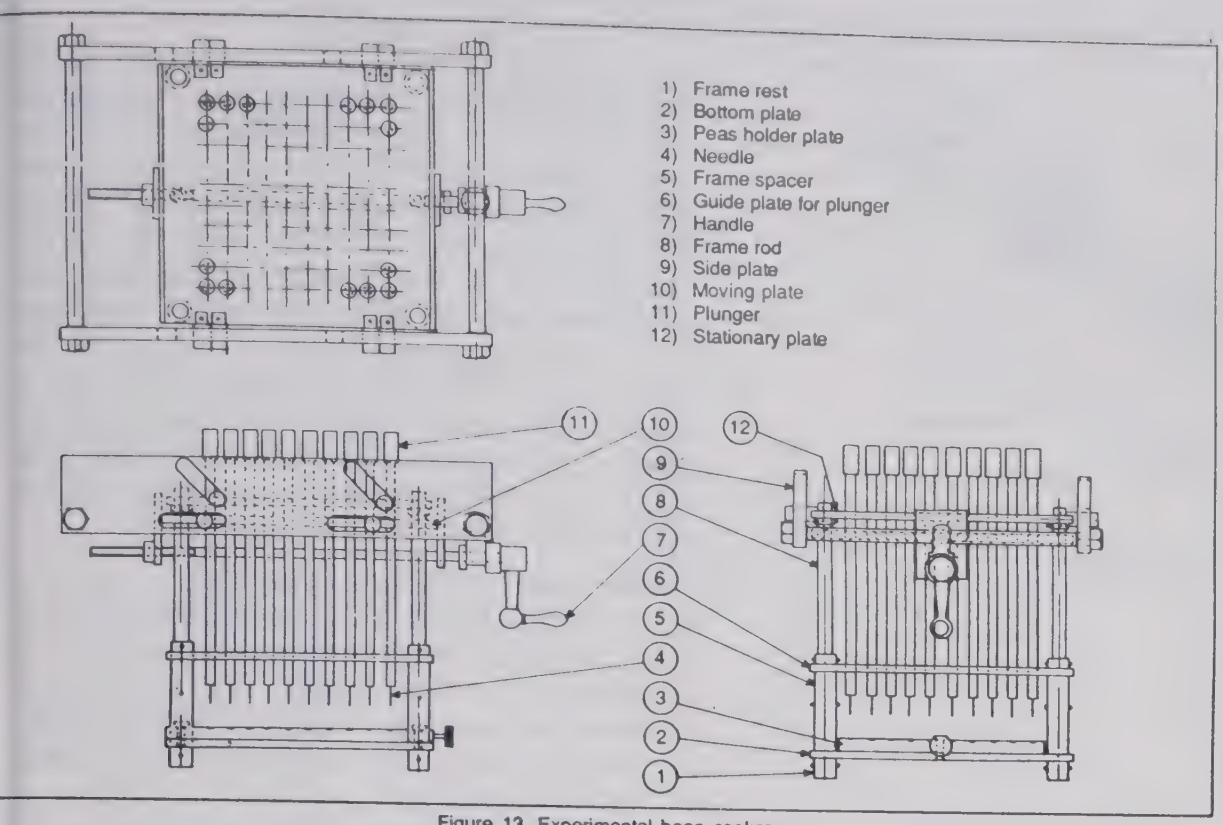

Figure 13. Experimental bean cooker.

tion in December 1990 was adjudged the best for its simplicity and innovativeness, and an award was given for this by IBPL Urja Foundation, the organisers of the exhibition.

The main working principle of these dryers shown in Figures 14 and 15 is black body heat absorption (of metal surfaces) from the solar radiation. No reflector, lens or concentrator has been used for this purpose. Black body metal surface of aluminium conducts the heat and transfers it to the inside air. Here a natural convection current is set up. Inside heated air of dryer removes moisture from the products and goes through the vent. Fresh air enters and gets heated up and this process keeps on removing the moisture from product till it gets dried. In 32 to 48 hours moisture content of grapes could be reduced from 80% to 16%. The inside temperature of air at noon was recorded to be twice that of fresh air outside. The main advantages of this type of dryers are: drying is faster as compared to conventional solar drying in open field; the design provides for maximum utilisation of sunlight; and the material to be dried is not kept in open air where it is contaminated with dust, insects and flies and vulnerable to attack by microorganisms. Since the product dries faster, possibility of spoilage decreases. These units are simple in construction and can be fabricated easily without much capital investment. They are easy to handle and can be operated with ease requiring no special skill or training for farmers or housewives. As they are foldable they can be stacked one above the other when not in use and since there is no heater or fan, cost of energy for operation is nil. The only drawback of the solar dryer design is that the increase in outside wind velocity will reduce the inside temperature as a result of which drying time will increase. The dryers have been found to be very useful for preparation of raisins by drying of grapes, fish, extruded snack products, papads, vadi and home made products including drying of fruit juices of mangoes and jack-fruit and vegetable drying. These solar dryers are patented in BARC's name and are recommended for augmenting rural economy.

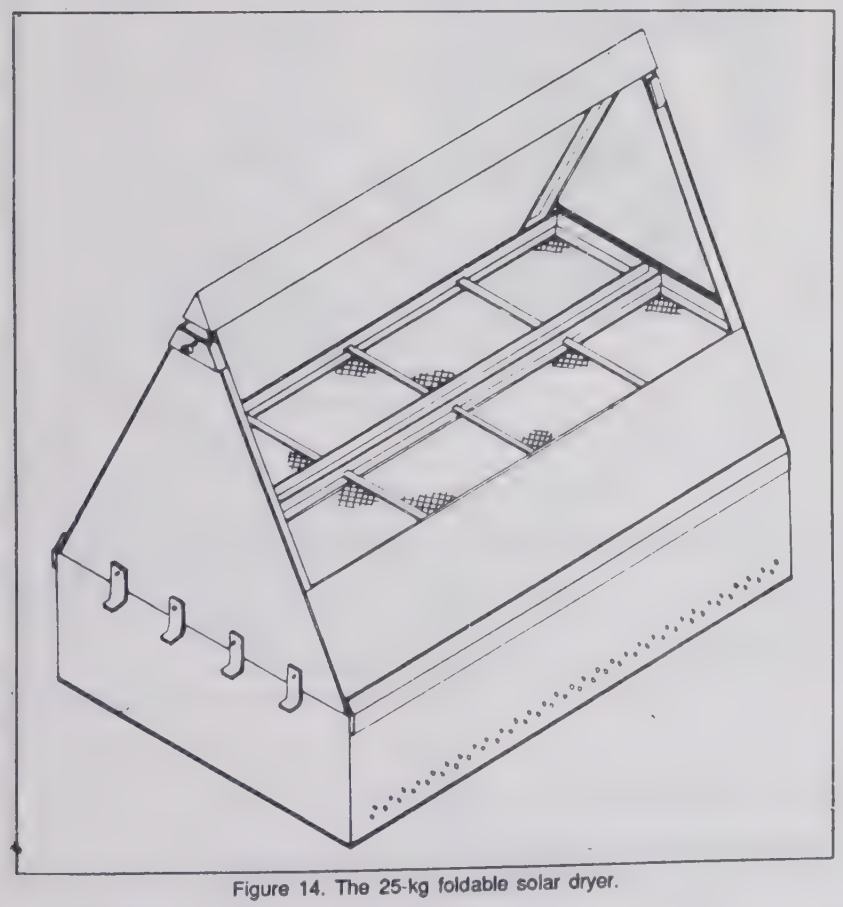

Figure 14. The 25-kg foldable solar dryer.

Hand operated groundnut decorticator

Groundnut farming is one of the major crops in this country. Hand operated groundnut decorticator will help a farmer by reducing both time and processing cost. Households and small traders produce roasted peanuts on small scale for food preparations and this decorticator is useful for them also. The unit described here could be mechanised with the operation of lever handled by a motor and introduction of some controls which will increase its fabrication cost but considering the amount of processing which will be done by the machine, recovery of cost could be done within 2 years. The details of the parts of the machine are shown in Figure 16. Groundnuts to be decorticated are fed through the hopper and the lever handle provided with the machine which controls and regulates the movement of concave shaped metal assembly between the wiremesh is operated in such a way that groundnuts sandwiched between metal assembly and the wire mesh gets pressed and decorticated. Instead of concave shaped machine assembly old car tyres could also be used but then time required for decorticating may be slightly more, but probability of crushing will reduce. The same concave shaped metal assembly alternatively could be rubber lined. By operating the lever on the left hand and right hand sides 2 or 3 times, product mass kept in the hopper could be decorticated within 5 minutes.

Capacity of decorticating groundnut using this machine is about 150 kg/hr. while doing the same operation by one labourer it may take 2 to 3 days (8 hour operation). If the machine is further mechanised by motor drive, then processing capacity of 300 kg/hr to 1,000 kg/hr could also be achieved. Through the wire-mesh, kernels of groundnuts will come out and skins of groundnut will get accumulated in wire mesh which could be cleaned everytime by opening after each decortication operation. The machine is simple to operate and can be used by even ladies on site.

Roaster for Peanuts or Soyabeans

There has been considerable interest in the production of

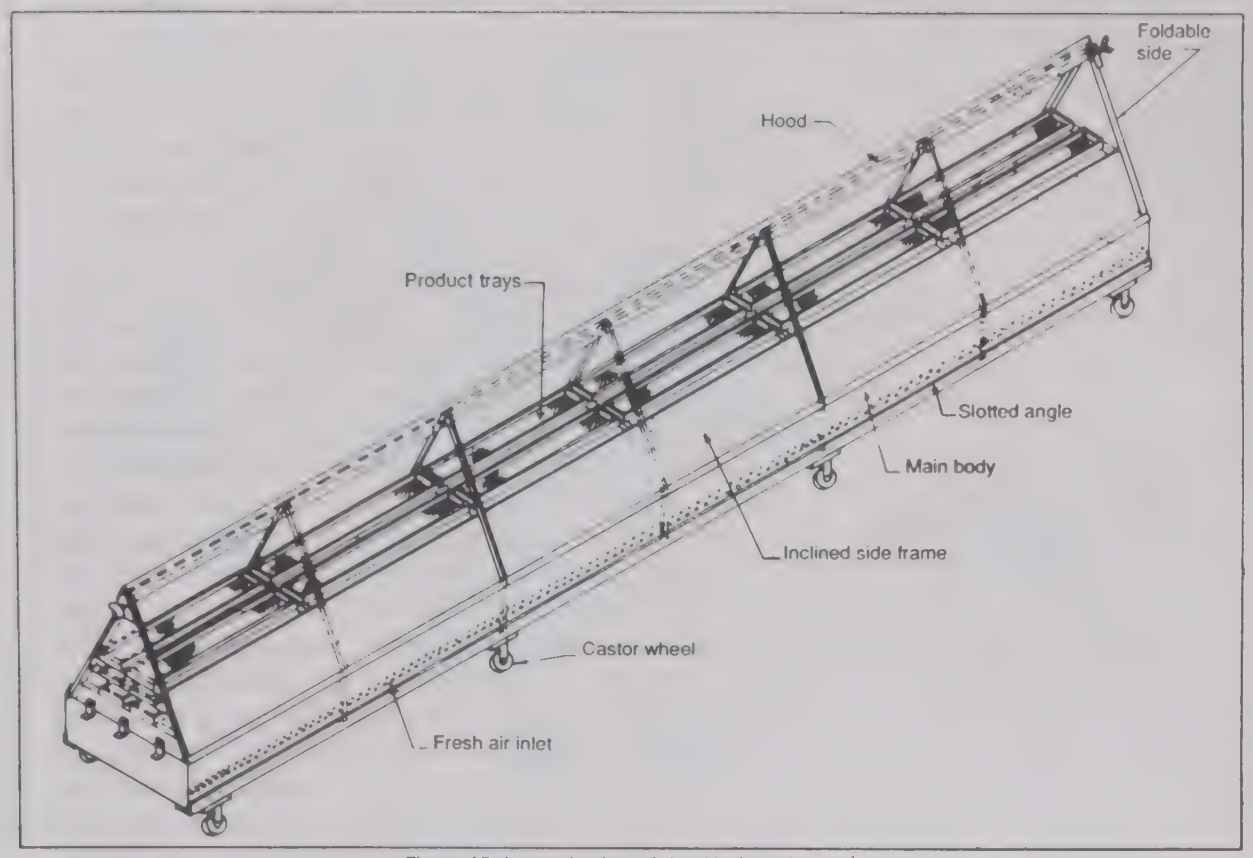

Figure 15. Isometric view of the 100-kg solar dryer.

defatted peanuts and soyabeans due to their high protein value and increased shelf-life. At FTEE Division, a roaster to process 1 to 3 kg of peanuts/soyabeans at a time within 5 minutes was designed and fabricated. The design features of the roaster shown in Figure 17 are high temperature in the range of 150 to 300°C can be obtained in a container within 10 minutes by flame adjustment of gas bunners; uniform heating of the product as it rotates on the heated surface of the container; the speed the rotation of the product in the container during roasting can be varied depending upon the nature of the material, and the container in which the product is roasted can be tilted with ease to any desired angle to avoid excessive heating of the product. Defatted peanuts roasted using this unit at 160 to 180°C for 1 to 1-1/2 minutes gave the product which was crisp, acceptable and better in taste as compared to product roasted using conventional sand pan. The same unit could be modified by use of electric heating instead of gas burner but considering from the utility point of view that the unit will be used in homes, canteens, by vendors and small scale industries, gas burner was incorporated in the design. All parts of the container are of stainless steel and the cost of machine will be in the range of Rs 5,000 to Rs 10,000 for a production capacity of 100 kg/hr to 200 kg/hr of roasted product. Operation and design of the machine are very simple and any person can operate the same after seeing its functioning.

Animal diet grinding machine

For making animal diet in powder form and then mixing it with other ingredients for feeding to animals for carrying out wholesomeness studies on irradiated foods, a small animal diet grinding machine shown in Figure 18 was designed and fabricated in the workshop. The machine was capable of grinding 60 kg of food lumps into fine food powder within 30 minutes. The unit consists of a hopper, grinding rollers with knob adjustments for adjusting the spacings, outlet and motor with speed reduction arrangement. Food lumps, i.e, dried food which could be mixture of wheat flour, fish, onions, vegetables or fruits are fed via hopper for grinding to fine powder. As soon as the food lumps come in contact with grinding rollers moving in opposite direction, they get pressed and crushed. Initially, grinding distance between the rollers is adjusted in such a way that initial lump size food material should be reduced to coarse size powder and then by sending the same coarse powder material for the second time very fine powder could be obtained, which can be used directly for

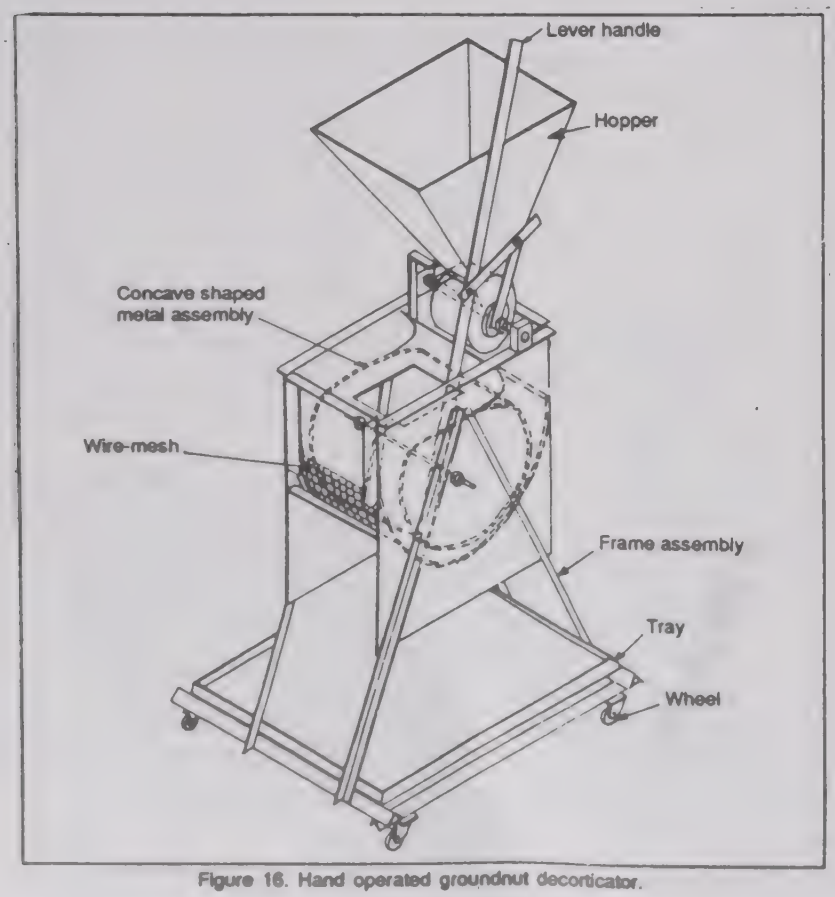

Figure 16. Hand operated groundnut decorticator.

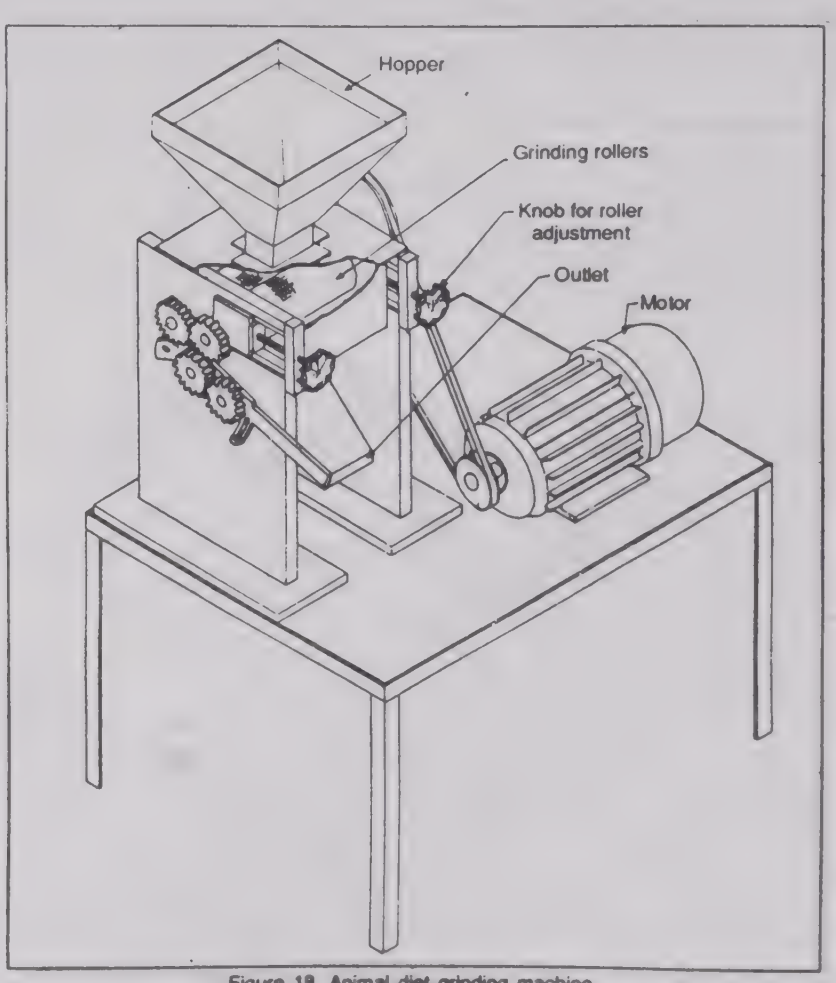

Figure 18. Animal diet grinding machine.

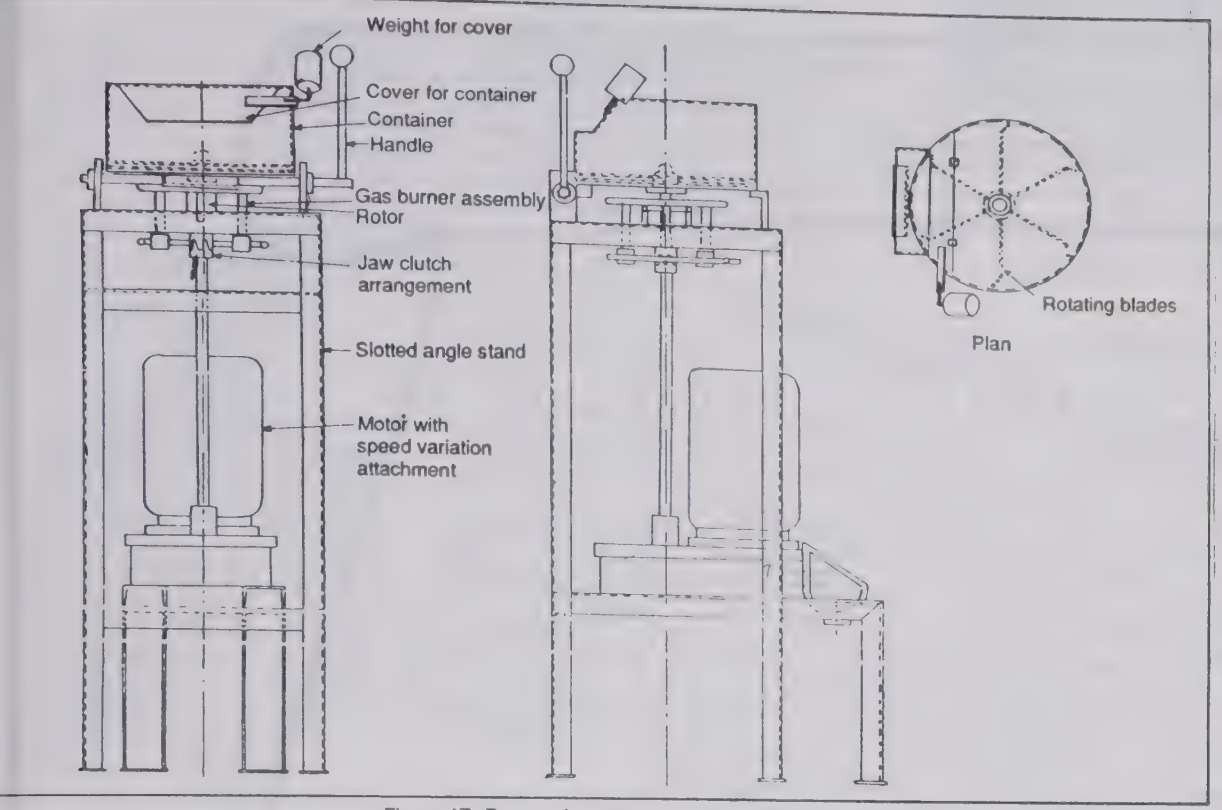

Figure 17. Roaster for peanuts and soyabeans.

animal diets. The machine more or less works on the same principle as flour mills making wheat flour.

Conclusion

From the above machines/equipment Suitable for production in small scale industries, the time required in food processing operation could be minimised considerably along with achieving good quality product. It is felt that more industries should come forward to manufacture these machines or units in food processing sector and improve upon these designs and concepts along with fabrication techniques so that utilisation and the use of these machines/units on commercial scale to a great extent will be possible in this country. Attempt has been made to make a beginning in this area and expected that it will be picked up by many users and entrepreneurs.

Acknowledgment:

Authors are thankful to all divisional workshop staff personnel who have helped in design, fabrication, installation, testing and operation of these machinery for R&D work in food processing operations on small and large scales. Special thanks are due to Dr. P.M. Nair, Head, Food Technology and Enzyme Engineering Division, for allowing the publication of this article also "Industrial Product Finder" in which the article has last appeared in June 1994 issue.

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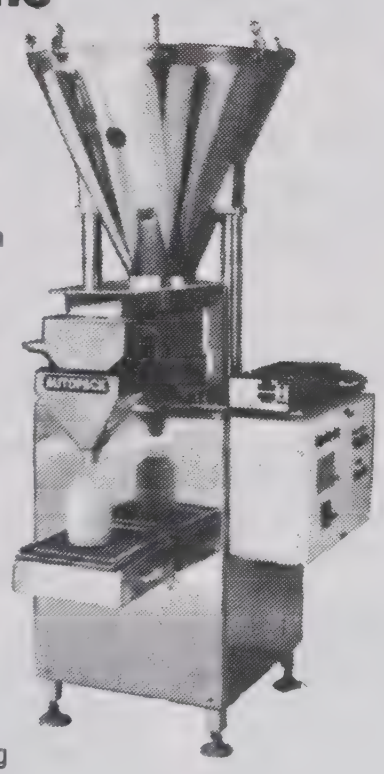

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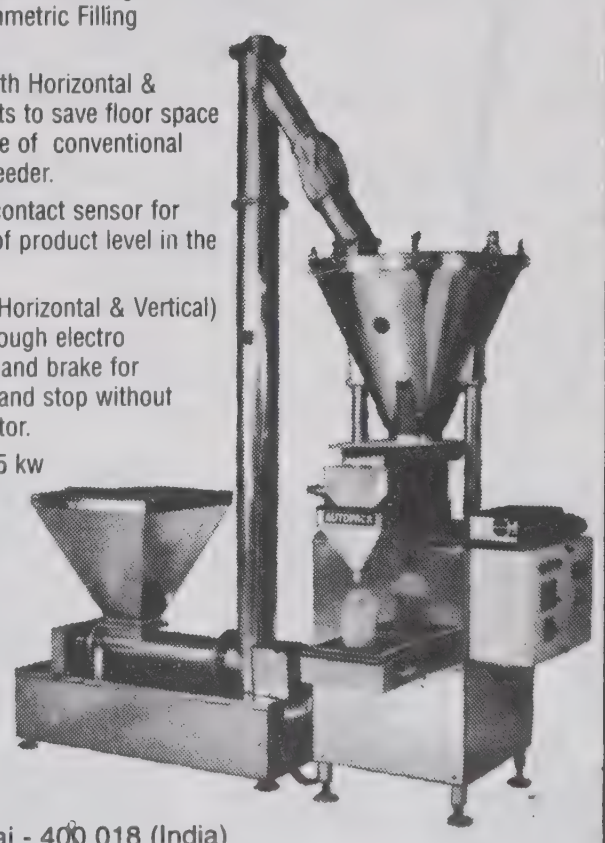

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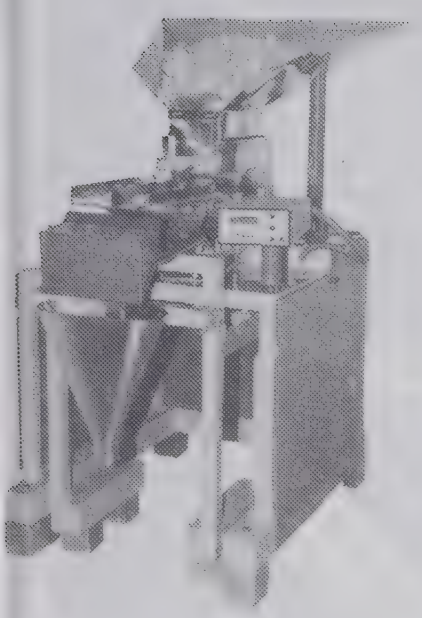

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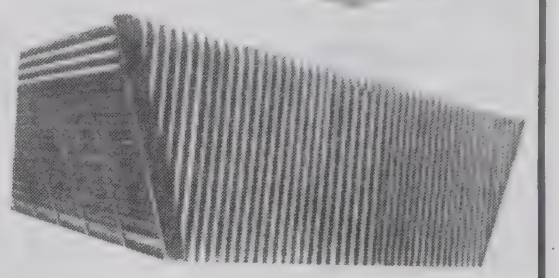

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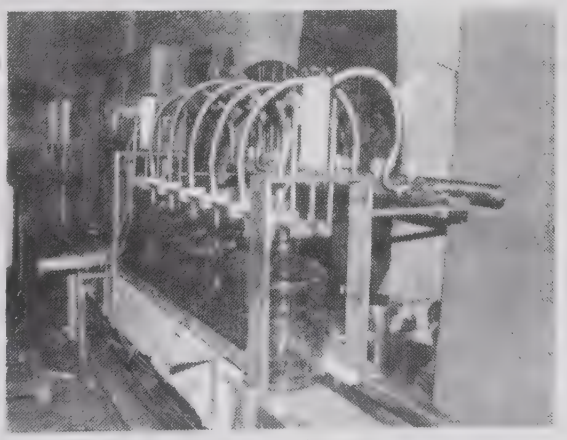

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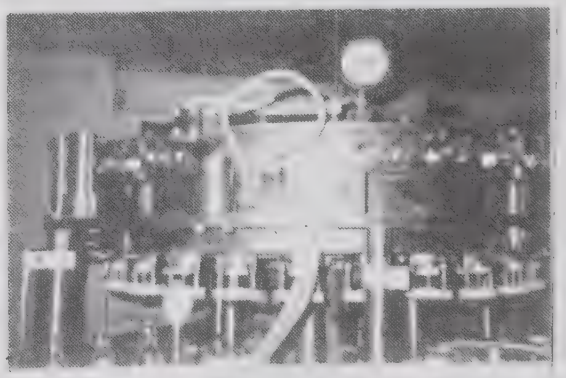


Automatic Counter Pressure Filling Machine

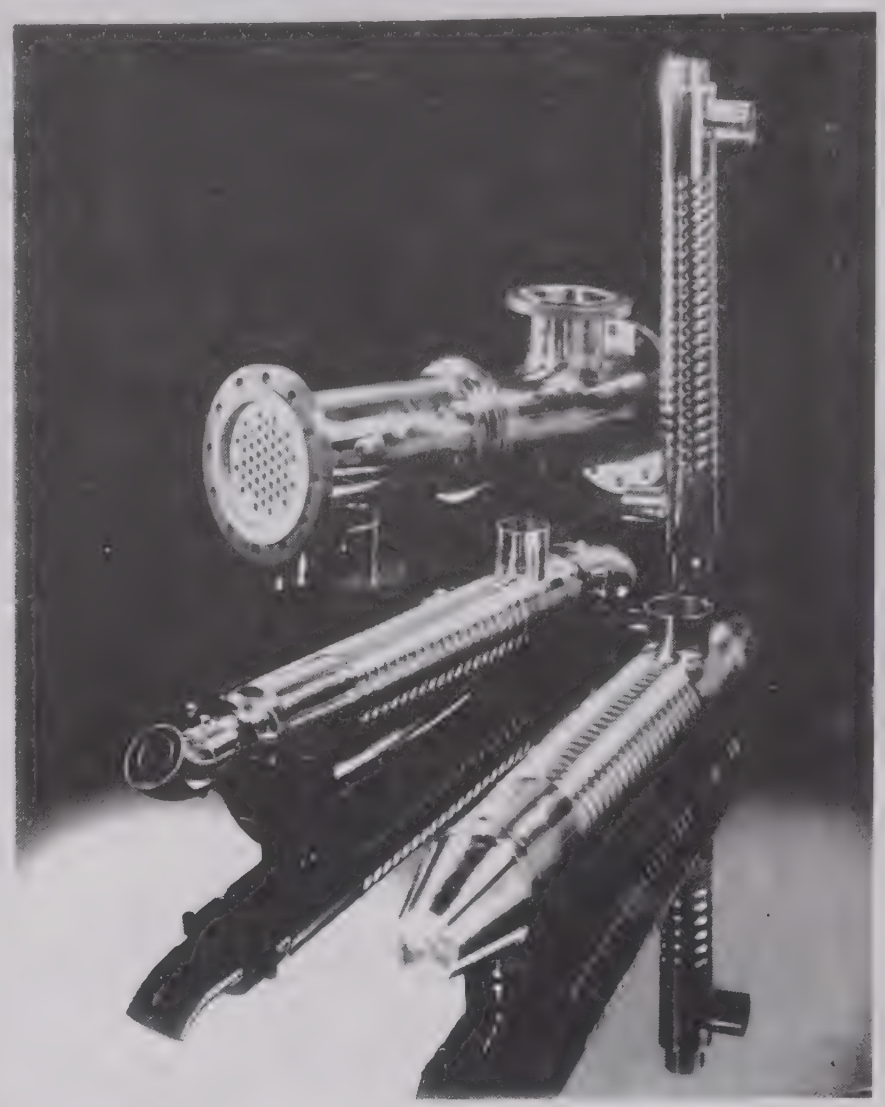
filpack

FILPACK ENGINEERING PRIVATE LIMITED

(Bottling & Packaging Engineers)
A-32, Phase-I, Industrial Area, Naraina, New Delhi - 110028
Tel: (O): 01191-5893219 (R): 7552785, 7503531 • Fax: 5791111
Email: filpackbottlingpackaging@engineers.com, nnarang@mantraonline.com

ECOFLUX*
HEAT EXCHANGER

TAKES THE
HEAT-OFF
YOUR MAINTENANCE
BUDGET



ECOFLUX* *Corrugated Tube Heat Exchangers are designed for uninterrupted operations with virtually no downtime for maintenance. Hence no stand-by unit is required, thus saving in investments. Moreover Ecoflux CTHE does not require gaskets and expensive spares Take a look at other advantages:*

- Compact Size, in some cases, less than half the size of a traditional plain tube heat exchanger
- Virtually maintenance free
- Longer running time as the turbulent flow reduces fouling
- High response to 'Cleaning-In-Place'
- High working temperature and pressure
- Uniform temperature distribution even for highly viscous fluids
- No product channeling
- Shorter residence time, low product hold-up
- No gasket requirement
- Extension of modules is easier

So, don't spend your time in maintenance.

Write to us today for the ECOFLUX* Advantage!

ASME (H & U)

TÜV CERT ISO 9002

In technical collaboration with HRS Heat Exchangers Ltd., UK.

Mr. V. Gokul Das, Product Manager
PRAJ INDUSTRIES LIMITED, Praj House, Bavdhan, PUNE-411 021 **Tel** (STD/ISD): +91 2139 52214/ 51511
Fax: +91 2139 51718/ 51515 **E-mail:** cthe@praj.net **Web**: http://www.praj.net

PRAJ INDUSTRIES

ECOFLUX*-Heat Exchangers for the 21st Century!

PRODUCT REVIEW

VISUAL COMMUNICATION

The visual display of ideas and informa-:ion is an integral element in modern lives. Since inception Alkosign Display System nas been exceeding customers expecta-:ions not only in product design and quality out also in innovative marketing, packag-ng and distribution.

It is this philosophy which ensures the nigh quality of all their products in the nternational markets, backed up by local distribution and customer support.

Whether at schools, offices, labs, con-erences or for presentations to customers one has to clearly project the information, Alkosign" high quality white boards, oinboards, felt boards and flip charts board stands offer flexible, space saving solu-ions for any situation.

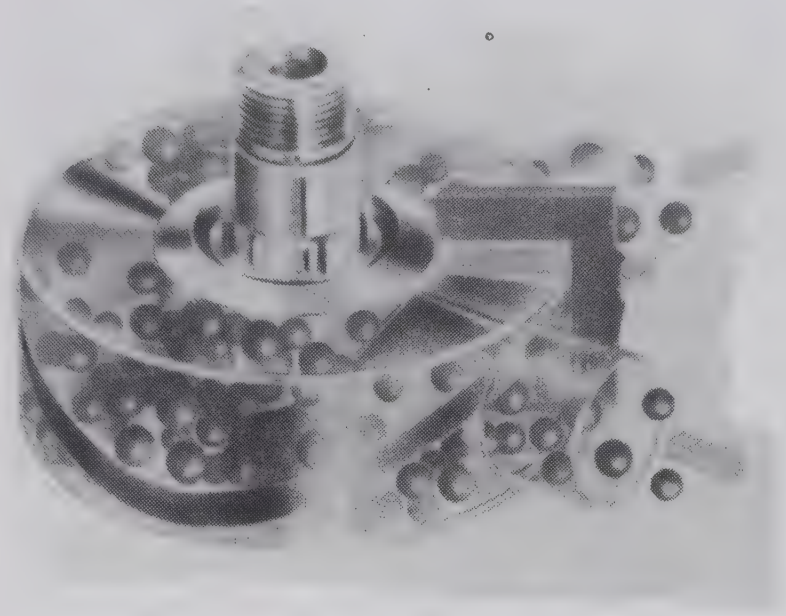
To be convincing, the message needs o be clear and visible. To communicate efficiently, one has to see Alkosign's vast ange of highly practical, well thought-out products. Alkosign, the name in profes-sional visual communication, has suc-cessfully established its place in the mar-ket.

Their range of products have been spe-cially designed for any occasion to com-municate full ideas and contexts with maxi-mum clarity.

For further details, contact:

Alkosign Display Systems
58 DD, Government
Industrial Estate
Kandivli (W), Mumbai 400067
Tel: 8688025/8684070 •°Fax: 8694814
Email: alkosign@vsnl.net
Website: www.alkosign.com

SAFE PUMPING OF SHEAR-SENSITIVE FOOD PRODUCTS



Indian processed food and beverage industries have a challenging opportunity due to increasing domestic demand, albeit of global standards. Pumps for damage-free pumping of shear sensitive particulate bearing products like processed food, tomatoes, jam, meat with mayonnaise, mushrooms, soups, sauces, chilled and frozen products, salads and sausage emulsions, in-process or to filling heads, are now available. MASO Process Pumpen GmbH designed a simple and ingenious solution: MASO SINE PUMPS. The basis of the principle on which the pump functions is a CNC-ground special steel disc with two sine wavelike curves. The difference to the product pre-and post-pumping is hardly discernible. Safe and gentle unloading/transfer of concentrated fruit juices (apple, mango, orange, lychee) is possible. Due to excellent suction capability, can even transfer frozen orange juice concentrate at minus 11°C. Low viscosity juices are pumped without pulsing, allowing uniform and stable flow to filling heads. Virtually all wearing parts can be replaced in-situ, without disassembly of any of the pipes. As a clear indication of the stability of the components, MASO provides a 10-year guarantee on the main pumping components (casing and pumplid). Application specific options are different MoC's, radial rotary shaft seal, end connections, CIP compatible, aseptic design. These pumps are manufactured at MASO's plant in Germany under DIN EN ISO 9001, TÜV certification, and are available up to a capacity of 90,000 LPH and pressure of 10 or 15 bar.

For further details, contact:

Kaptan's Vistas Engg. Pvt. Ltd.
103 Jagruti Indl. Estate, 771 Mogul Lane
Mahim (W)
Mumbai 400 016
Tel: 432 7985, 436 2539
Fax: +91-22-430 1913
Email: kaptansvistas@vsnl.net

CANNING MACHINES

Cantech Machines established in 1987 by A. P. Pandya, an engineer with over 30 years of experience at Metal Box Co. of India Ltd. is a trusted name for fruit and vegetable canning machineries.

Cantech's can seaming and reforming machines have international standards and are highly suitable for canning fruits and vegetables. The machines have the capacity to manufacture 10-30 cans per minute.

The Can Seaming & Reforming Machine is Semi Automatic Seaming Can with diameter 51 mm to 178 mm and height 51 mm to 248 mm. Output 20-40 cans per minute depending on size. The machines is robust, and easy to handle.

The other machine is CM 510 body beader is suitable for beading flanged can bodies at an output speed of 20 to 25 cans per minute depending on operator's skill and size of container. Diameter Range: 75mm to 175mm, Height Range: upto 250mm.

Pear pointed gauge is an instrument for determining the vacuum in an open top can for processed food. It can also record pressure developed in the can due to spoilage or hydrogen formation.

Semi Automatic Seamer with speed of 30-40 cans per minute, Body Reformer, Hand Flanger, Flange Rectifier, Body Beader, Embossing Press, Testing equipment are some of the other machines manufactured.

Cantech seaming machines have also been exported to the Middle East and various African countries. Cantech represents Shin-I Machinery Works Co. Ltd., Taiwan for high speed seamers and Chase Manhattan Inc-Taiwan for easy open ends.

For further details, contact:

Cantech Machines
13, Vora Bhawan
1st Floor, King Circle
Matunga (C.R.), Mumbai 400 019
Tel: 4096086, 4096853
Telefax: 91-22-4096086

MIOX WATER DISINFECTION SYSTEMS

Ion Exchange (India) Ltd. has further extended its total water management capability with a significant tie-up with MIOX Corporation, USA for the exclusive distribution and marketing of mixed oxidant (MIOX) water disinfection systems in India, Nepal and Bangladesh.

The MIOX disinfection process uses a proprietary electrolytic cell to electrolyse a solution of brine and produce a consistent mixture of powerful oxidants which in combination are much more effective than chlorine products and kill a much wider range of microbial contaminants present in water. MIOX disinfection systems are also the only onsite mixed oxidant generators that, unlike other onsite chlorine generators or traditional disinfection using solution hypochlorite (NaOCl) and hypochlorous acid perform a number of functions through a single process.

Achieving rapid and superior disinfection, MIOX can inactivate harmful bacteria like cryptasporidium and giardia which chlorine cannot. It can also rapidly oxidise iron, manganese and hydrogen sulfide and improves the taste, appearance and odour in water and has a along lasting residual effect. MIOX models are fully automated and run unattended for many days, self-diagnose fault conditions, and generate a constant concentration of oxidants as needed. MIOX is totally harmless and no special protection is needed while handling it. No hazardous chemicals are required for its operation nor are they generated by the system. Thus personal and community safety is maintained.

MIOX Corporation, USA was incorporated in 1994. It is known for the best customer service in the water treatment business in USA and has hundreds of installations worldwide.

Ion Exchange India, leaders in total water management, have always been quick to introduce world class, latest technologies through its R&D or via strategic tie-ups. MIOX systems with their multiple advantages would be especially important to key industries like drug & pharma, mineral water and food & beverage industries as well as for hospitals and municipal drinking water projects.

For further details, contact:

Mr. Ajay Popat/Jayesh Shah
Ion Exchange (India) Ltd.
Tiecicon House
Dr. E. Moses Road
Mahalaxmi, Mumbai 400 011
Tel: 022-493 9520/23/25 Ext. 370
Fax: 022-493 8737
Email: ajay_popat@ho.ionxchng.co.in

GABLE TOP CARTONS

Elopak is one of the world's leading suppliers of packaging systems for liquid food products. Fillers, packagers and engineers, working together, have turned a simple piece of cardboard into a sophisticated support device for Elopak's Pure-Pak® gable-top cartons in transportation.

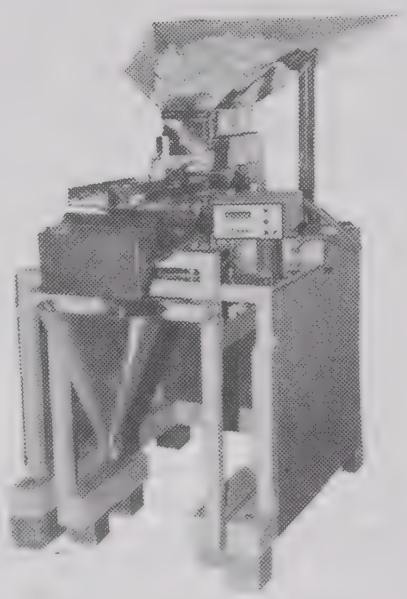
When placed on the top of two parallel rows of Pure-Paks®, a folded piece of cardboard in a special triangular shape distributes the weight of the cartons evently, thus protecting the top of each row of gables.

In addition to the Pure-Pak® system, Elopak also markets the aseptic plastic pouch packaging system, Elopouch®, for milk and juice, and the Unifill® plastic packaging system, whcih is a form-fill-seal system for liquid food and non-food products. From 2000 onwards, Elopak's goal is to extend its portfolio by offering a range of plastic packaging alternatives based on PET and HDPE. As a full systems supplier with organizations and associates in approximately 40 countries and customers in more than 100, the Elopak Group seeks to bring its international expertise and product technology to new markets.

For further details, contact:

Elopak PR Support
The Marketing Department
Lower Street
Willoughby, Rugby
Warwickshire, CV238BX, UK.
Tel: 44(0)1788 891210
Fax: 44(0)1788 891216
Email: marketcomms@aol.com
carolinesephton@aol.com

WEIGH- FILL MACHINES



Kaizen Enterprises offer *Kaizen Tula* semi-automatic weigh-fill machines for packaging tea, coffee, beans, sugar, grains, farsans, wafers, oilseeds, pulses, dryfruit, etc.

The microprocessor Weigh Controller is used for accurate weigh controlling along with loadcells and electromagnetic vibrator. The filling range is from 50gms - 1kg and 1kg to 5kg. The product hardly needs any maintenance. Twin head and multihead versions are also available.

For more details, contact:

Kaizen Enterprises
A-5, Trupti, G.V. Scheme Rd. #4
Mulund (E)
Mumbai 400081
Telefax: 5646873
Email: kaizen@zeenext.com

When Replying to Ads
Please Mention
BEVERAGE & FOOD WORLD

MINIATURE MICROWAVE

Armfield announce a new miniature-scale microwave UHT unit. Miniature-scale microwave UHT-HTST unit reaches 140°C in a second. A 6kWatt microwave UHT/HTST unit which can raise product temperature from ambient to 100°C in under a second is introduced to the Armfield range of miniature-scale equipment used by researchers and developers in the food and pharmaceutical industries.

The FT84 unit is for very rapid heating of small quantities (0-20 litres per hour) of viscous, non-viscous and even non-homogeneous products. Typical applications include body foods, purees, pasta, puddings, custard, sauces, soups, pharmaceuticals, gelatins and milk among oters.

Temperatures upto 160°C can be reached with some products capable of rising from ambient to 140°C in less than one second.

Rapid heating means product is less likely to be damaged through denaturation of proteins and vitamins and the Mailard reaction is less likely. Because microwave heats the product from the inside out, heating is uniform and there are no hot walls on which it can burn. The FT84 can be linked to Armfield's FT74T miniature-scale tubular heat exchanger system when the properties of the product make pre-heating preferable. It can also enable lower output temperatures for the product.

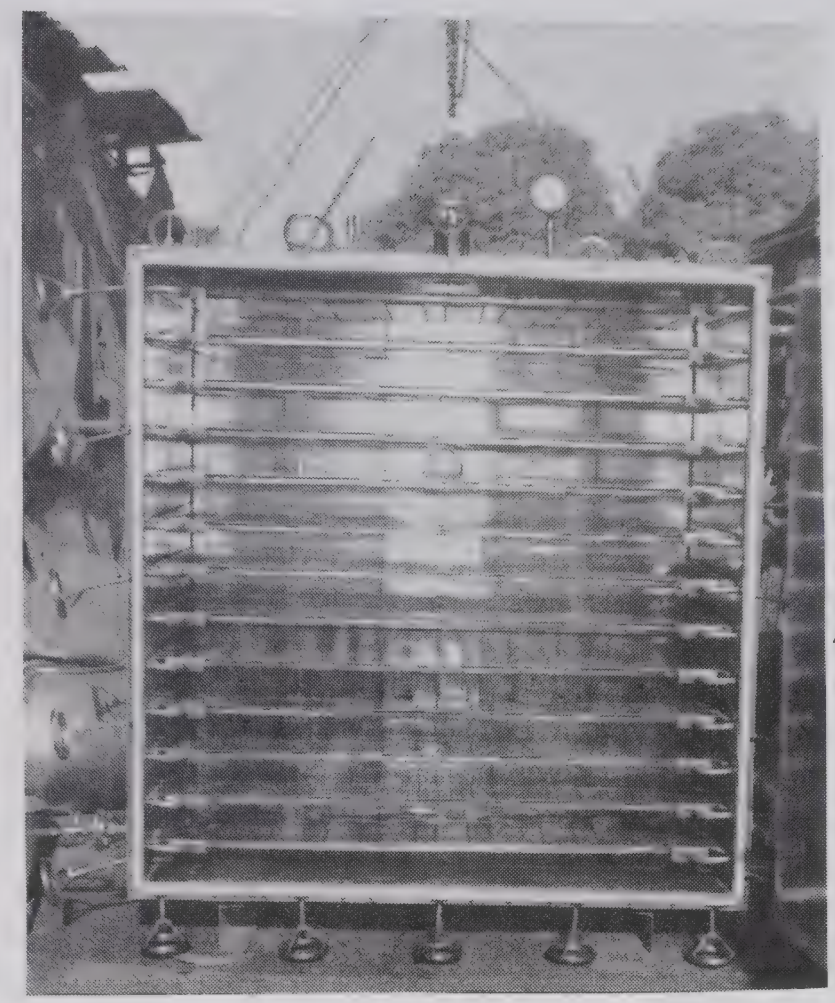
Miniature-scale product development has become increasingly popular with researchers because they can test formulations on a small scale saving time and materials while gaining enough information to scale up to pilot or production plant.

The Armfield range includes plate tube, scraped surface and direct steam injection heat exchangers, edible oils processors, spray dryers/chillers, and carbonator/fillers.

For further details, contact:

Armfield Ltd. Bridge House
West Street, Ringwood
Hampshire, England BH24 1DY
Tel: 44 1425 478781
Email: sales@armfield.co.uk

VACUUM TRAY DRIER



Magumps, a well-known name in the field of pharmaceutical bulk drug process industries for high quality equipment and plants now introduces the Vacuum Tray Dryer useful for rapid drying of material sensitive to heat and oxidation. This dryer can be used in fine chemicals, food and pharmaceutical industries and are available in standard/GMP/CGMP constructions, with different sizes/capacities i.e. to hold 12 / 24 / 48 trays of 800 x 400 x 50mm size. The Dryers are specially designed so as to withhold full vacuum (700 Hg with only a drop of 75mm/ 24 hrs.) The main chamber of the drier is made out of thick S.S. plate, which are fully welded by argon arc process with heavy duty M.S. stiffeners as well as light and sight glasses are provided from outside. The heating is done with hot water or low pressure steam which is circulated through the shelves fitted inside the dryer. The heating shelves are designed ensuring 100% flat surface for effective heat transfer through thermal conduction with the S.S. Trays. These shelves are hydraulically tested at a pressure of 5kg/cm. sq. The door is swing type on heavy hinges and is fabricated from thicker S.S. plate having nut and bolt with wheel arrangement all across to ensure 100% tightening the chamber ensuring no leakages. The gasket on the door is foodgrade neoprene rubber.

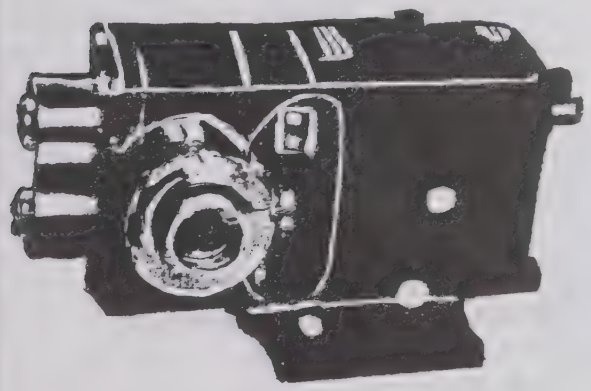
The dryers are provided with a condensor and receiver. The condensor is designed for effective heat transfer area with all contact parts made out of S.S. and the tubes manufactured of seamless pipe. The shell of the condenser is made of MS.

The receiver is manufactured with S.S. contact parts with sight/light glass and is in two parts so that the condensate can be collected effectively during the operation. All the flanges used are of ASA-150 design. The dryer can be supplied complete with S.S. trays, vacuum pump (optional) temperature controller cum indicator (optional).

For further details contact :

Magumps
Trisandhya 'A'
97, D. Phalke Road
Dadar (East)
Mumbai - 400 014.
Tel: 411 3572, 415 4474
Fax: 022-413 7648 / 8307
E-mail: magumps@bom5.vsnl.net.in.

LOBE PUMP / BUMP PUMPS



We have pleasure in introducing Parag Engineers, an innovative and highly motivated firm, as a leading manufacturer of Bump Pump and Lobe Pump.

Bump Pump specially developed for transferring of semi solid liquids like cream, tooth paste, wax, glues, cheese and butter and other such liquids.

Application: PARAG Bump Pump & Lobe Pump are suitable for transferring a variety of media in pharmaceutical, food and beverage, dairy, cosmetics, paint, oil lubricant and chemical industries.

Pumped Media: PARAG Pumps are designed for handling viscous liquids, slurries and semi solid liquid products like pastes, creams and gels e.g. butter, ice creams, soft cheese, shrikhand, egg yolk, fats, oils, syrups, hair oils, cosmetics, creams, tooth paste, starch, paints, gelatine, glues, wax paste etc.

Construction: The PARAG Lobe Bump Pump, operating on positive displacement are manufactured in two versions - "bare shaft" and "coupled with motor". In the case of pump coupled with motor, the pump can be supplied mounted on a base plate or a mobile trolley.

Pumps conform to stringent international standards of quality & performance and ensure maximum efficiency, economy and hygiene in operation.

All parts coming into contact with the pumped media are made of high grade stainless steel with polished crevice-free

interior; High precision, wear resistant mechanical seals are used to ensure perfect sealing. The sanitary design on PARAG Lobe Bump Pumps facilitates sterilization as well as quick dismantling and easy cleaning, with minimum maintenance.

For your requirements, contact:

Parag Engineers
B-7, Trimbakkar Estate Street No. 22
Nr. Rolta India, Opp. V.I.P.
Andheri (E), Mumbai - 400 093
Tel: 91-22-8230738
Fax: 91-22-8234215

ULTRAVIOLET WATER DISINFECTION SYSTEM

The Ultraviolet Water Disinfection System using the latest US based Teflon® Technology is the ultimate answer to prevent pollution and contamination in water. Non-fouling Teflon® Tubes UV units for water and waste water treatment are used to over come scale problems. These units find application in disinfection of drinking/ process water, pre-treatment before R.O., algae and slime control, purer fermentation products. The system can also be used for various industrial applications such as supply of high purity water for beverage, bottling, brewing pharmaceuticals, food processing etc. It achieves near cent percent water purity without any side effects. It is also cost effective and maintenance free.

Among the products offered are various models of water disinfection systems, ranging from 225 LPH to 12 Lac LPH of UV systems, micron filters, carbon filters, air irradiators etc.

For further details, contact:

Hitech Ultraviolet Pvt. Ltd.
P.O. Box. No. 8356
35, Grace Plaza, S.V. Road
Jogeshwari (W), Mumbai 400 102
Tel: 6790610, 6794611, 6794327
Fax: 6794337
Email: hitechuv@bom5.vsnl.net.in

PROTEIN HYDROLYSATES & PAPAIN

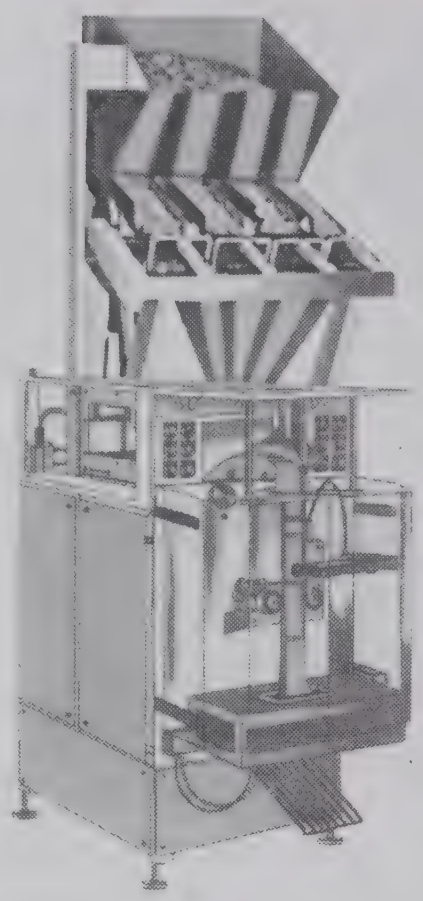
High quality, spray dried Protein Hydrolysates from casein, soyabean, meat and silver used in food, health, beverages, high protein suppliments, feed suppliments for animal and poultry feed and for bacteriological purpose as culture media.

Papain is made from papaya products, breweries, tanneries etc.

For further details, contact:

Vashist ImpEx
Gaumukh Bhavan, 2nd Floor
18 Masjid Bunder Road
Mumbai 400 009
Tel: 377 8830/231 2955
Telefax: 373 6445

FORM-FILL-SEAL MACHINE



The form- fill-seal machine from Unique Flexo forms, fills and seals the package from the reel. The result is a sachet so tightly sealed that it keeps food or pharmaceutical products fresh maintaining its sterility. The separation of individual sachets can be reached either by a knife system or by a hotwire cut off system. All contact parts of the machine are of S.S. 304 grade.

This machine can be used for packing various products such as Milk, Juices, Tea, Coffee, Pesticides, Detergents, Oil, Medicines, Chemicals etc...

Salient features:

* Packs 15 gms to 1 Kg of powders and granules and upto 1 litres for liquids * Basic machine can be mounted with powder, granule or liquid filler * Automatic Batch Coding & Date of packing device provided * Speeds up to 45 pouches per minute per track * Available in Single and Double track models * Handles all types of heat sealable films * Optional photocell registration unit.

For more details, contact:

Unique Flexo Packaging
Gala No. B270, Off Manpada Rd,
Opp. Kasturi Plaza
Joshiwada, Dombivli (E) - 421 201
Email: unipack_2@hotmail.com

LIQUID FILTERATION SYSTEMS

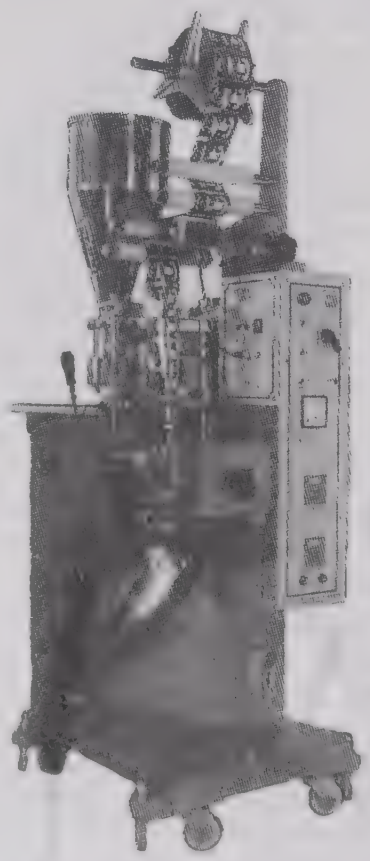
Mavish Engineering Works has brought to India for the first time the new concept for liquid filtration system instead of sparkler filter press/zero hold filter press. It is a compact steam jacketed unit for filteration for hot/cold liquids, beverages, chemicals etc. The unit is made of strong S.S. Tank with top covered & tightings 500 lts. per hour. It can also be made of S.S. 304 & S.S. 316 as per customer's need.

Their other product range include centrifugal monoblock pump, Rotary gear pump, Gear pump, Lobe pump, Liquid filling machines and turn tables.

For further details, contact:

Mavish Engineering Works
Hill View Apartments
C-402, Marol Military Road
Andheri (E), Mumbai 400058
Tel: 8504375/8574376

FORM-FILL-SEAL MACHINE



The fully automatic vertical form-fill-seal machine from Gurdeep Packaging finds application for packing any free flowing powder and granules, spices, soup-concentrates, soft drink concentrates, pharmaceutical powder, detergents, tea/coffee, pan masala, supari, confectioneries etc.

Specifications: Sealing Type: 3 sides sealing/4 sides sealing. Packing Size: 50-120mm, or 100-240mm (film length). 20-160 mm, or 20-220 mm (film width). (enlarged type can be made upon order). Speed: 45-90 bags/min, 60-120 bags/min. (Depending on flowing rate and volume on packing objects). Packing Material: All heat sealable laminate PET/POLY, PET/FOIL/ POLY MET, PET/POLY/CPP/OPP etc...

For your requirements, contact:

Gurdeep Packaging Machines
Harichand Compound,
L.B.S. Marg,
Vikhroli, Mumbai 400 079
Tel: 5783521, 5772846, 5795982
Fax: 91-22-5772846

QUALITY RUBBER COMPONENTS

'O' RINGS, VENT TUBE SKIRT, LIQUID SEAL, BOTTLE SEAL, SMS RING, 'U' & 'V' SEAL, OIL SEAL, DIAPHRAGM, CANNING SEAL, DIN RING, MAINLY MFG. IN NITRILE, NEOPRENE, EPDM, SILICON, POLYURETHANE & VITON RUBBER

WE HAVE EXPERTISE IN

IMPORT SUBSTITUTE RUBBER PARTS LIKE BUTTERFLY SEAL, TRICLOVER SEAL (PROREF GASKET), DOMI SEAL, LABELLER ROLLER, LIP SEAL, ORIFICE GASKET, ETC. AS PER SAMPLE.

FOR PRECISION RUBBER PARTS CONTACT:

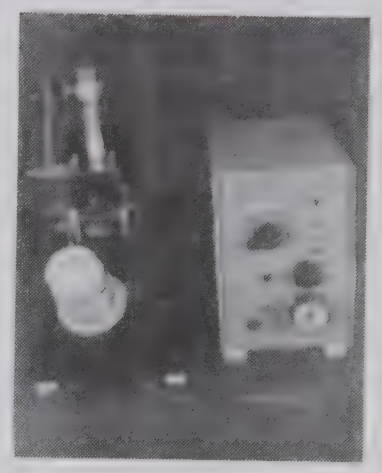
HARKESH RUBBER INDUSTRIES

106, Madhu Industrial Estate
Mogra Pada, Andheri (East)
Mumbai - 400 069
Tel: 8364847, 8393337 • Fax: 022-8210414
Email: harkesh1@hotmail.com

ELECTRO PNEUMATIC INKCODER

Salient Features:

1. SR-100 Electro Pneumatic Coding Device is an intermittent Coder for printing of price, batch no., mfg. date, expiry date etc. on the flat surface.
2. It can be mounted to any intermittent packaging machine.
3. Solo unit can be used as an automatic/semi-automatic functions to print the matter on tins. boxes, labels, bags and preformed pouches etc.
4. Speed of SR coder is depending upon the speed of parent machine.
5. It can be mounted in any direction.
6. Special moulded ink pad to release right amount of ink for each impressions.
7. Suitable ink developed by us and certified by CFTRI, Mysore.
8. Fit and Forget technology is used for better self-life.



SOLO UNIT

Technical Specifications:
• Printing Area 30mm × 60mm, 3-4 Lines • Speed-max 100 cycles/minute • Compressed Air Pressure 3 Kg/Cm • Weight 4 Kg • Printing Medium-Special ink available in red, blue, green, voilet colours • Jet Coder Wash solution available.

Manufactured by:

SREERANG TECHNOLOGIES PVT. LTD.

#61, KSRTC Layout, 4th Cross, 1st Main
J.P. Nagar, 2nd Phase, Bangalore 78
Tel: 6588472, 6588560 • Fax: 91-80-6583951

MECHANICAL CODER AVAILABLE

Automatic Liquid Filler Cum Bottle Capper

Multi Head Monoblock Rotary Liquid Filling & Capping Machine Ideal for Oil / Pharma Industries and Distilleries

Special Features

- Rotary Valve for Drip-Proof Filling
- Facility for adjustment of volume in individual or all cylinders simultaneously
- Speed can be precisely controlled with AC Frequency Control System
- Easy adjustment of Filling Head height to suit different containers.
- Handles variety of containers/caps.
- Tightening Torque adjustable to desired levels.
- Can handle both plastic pre threaded and ROPP caps.

Tech. Data:

- Number of Heads : 4 to 12
- Output : Upto 7200 fills/hr.
- Fill Range : 50 ml to 5 Ltrs.

Other Models:

- Higher speed models on request.

AUTOPACK MACHINES PVT. LTD.

101-C, Poonam Chambers, Dr. A.B. Road, Worli, Mumbai - 400 018 (India)
Tel : 497 4800, 492 4806, 691 9458 • Fax: 022-496 4926, 652 6163
Email : autopack@bom3.vsnl.net.in • Website: http://www.autopackmachines.com

AUTOPACK

VERTICAL FORM-FILL-SEAL MACHINE

The new Winpak WD-18 packages particulate dry products at high output and is the first vertical form-fill-seal machine capable of filling multiple lanes of free-flowing particulates. The WD-18 from Winpak Inc. is able to operate 700 pouches per minute and maintains maximum production efficiency by using the same operating principles for pouch packaging as does the Winpak L-18, the workhorse of the liquid pouch industry. In production tests at a US packer of salted nuts for the past one year, the WD-18 has run 7 lanes at 55 strokes per minute continuously, proving that this machine can handle the demands of high-end packing operations for a wide variety of particulate dry products.

For further details, contact:

Winpak, Inc.
998 S. Sierra Way
San Bernadino, CA 92408
Tel: 909 885 0715,
800 804 4224
Fax: 909 381 1934
Email: sales@winpak.com
Website: www.winpak.com

FILLING MACHINES

Apex Electromec Pharma Pvt. Ltd., having industrial machine manufacturing experience of nearly two decade, has made its formidable foray in food and beverage Industry.

The company manufactures single and multiheaded automatic powder/granule Fillers. The accessories it offers for the filling line are swing and slat conveyor, turntable, endless packing conveyor and combicapping multiheaded machine.

Apex Electromec Pharma also offers Infrared Ray Dryers and Material Handling equipments like fixed lifter, mobile stacker, lifters and filter and round IPC.

For more details, contact:

Apex Electromec Pharma Pvt. Ltd.
16, Nitin Indl. Complex
Ghaitan Area, # 1, S.P. Road
Near Vaishali Nagar
Dahisar (E)
Mumbai 400 068
Tel: 8964096 • Telefax: 8960263
Fax: 8968615
Email: apexppl@hotmail.com
Website: www.apexelectromec.com

CORRUGATED TUBE HEAT EXCHANGE

ECOFLUX corrugated Tube Heat Exchangers have been introduced by Praj Industries of Pune. These are specially designed to meet the hygienic requirements in fruit processing applications like fruit pulps, purees, juices and slices.

Corrugated patterns on the tubes offer better heat transfer co-efficient and uniform temperature distribution, thereby maintaining the consistency and quality of the end product.

The ECOFLUX Exchangers offer significant advantages over conventional methods i.e. ● Compact sizes, saves on space ● longer running time, as the turbulent flow reduces fouling ● ease of inspection and cleaning ensures lower downtime ● low product hold-up ● high response to CIP which reduce changes of product contamination ● shorter residence time ● no moving parts, hence lower energy consumption ● double, triple or multi-tube construction for different applications.

For further details, contact:

Praj Industries Ltd.
Praj House
Bavdhan, Pune - 411 021
Tel : 91-2139-52214/51511
Fax: 91-2139-51718/51515
Email: cthe@praj.net
Website: http://www.praj.net

READY-TO-EAT SNACK PLANT

With an art of technology Guru Nanak Engineering Works established the trusted name amongst ready to eat snack food and processing food industries with quality consciousness keeping in view customer's satisfaction in totality with strong back-up of after sales service.

The paramount importance is their cost effectiveness of continuous systems on L.P.G., electric and diesel usage.

Guru Nanak Engineering Works offer sturdy roaster for peanuts, dalia, soya bean and cashew nuts.

Their ready to eat snack plants affirms theirs fine workmanship. Soya nugget plants are their speciality.

They manufacture various types of Driers and Mixers, Conveyor Reslide Oven, Box Type Ovens.

Corn flake plants and Gold finger plants are their special features.

For further details, contact:

Guru Nanak Engineering Works
D-107, Sector 7
Noida 20130, Dist. G.B. Nagar (U.P.)
Tel: 011-8-4542530, 4519360
Fax: 011-8-4535160
Email: meera@nd3.vsnl.net.in

When Replying to Ads, Please Mention
BEVERAGE & FOOD WORLD

WEIGHMETRIC FILLING SYSTEMS

Spanpak Systems is a Mumbai-based company known for manufacturing new concept Semi Automatic and Automatic Volumetric Liquid Filling Machine. The company has now introduced filling systems by weight which are manufactured to high standards of quality and durability yet economical with sophisticated electronic functions for filling jerry cans, drums etc. accurately and efficiently.

The filling system has the following features: • Non drip diving nozzles with automatic drip tray • Two stage coarse/fine fill • Under fill protection (tops up automatically if filling quantity is less than target quantity) • No container No fill • Heavy duty gravity roller conveyor on scale platform • Micro processor control system with backlit LCD digit height of 20 mm of easy readability with numeric key-pad for easy fill cycle setting. Optional RS 232 port for further data processing or recording • Parts in contact with the product either in SS-304/316 or treated mild steel • Supplied with or without pumpset • Also available in explosion proof version • State of art design conforming to world standards Mettler Toledo weighing systems incorporated.

The company also manufactures optional equipments like entry and take away conveyors, palletizers, capping machines and special purpose machines for end of line packaging applications

For more details, contact:

Spanpak Systems
B-136, Ghatkopar Industrial Estate
Off L.B.S. Marg
Ghatkopar (W), Mumbai - 400 016
Tel: 5170184/5170144 • Fax: 5173352
Email: spanpak.filling@axcess.net.in

MULTILAYER LD/LLDPE FILM

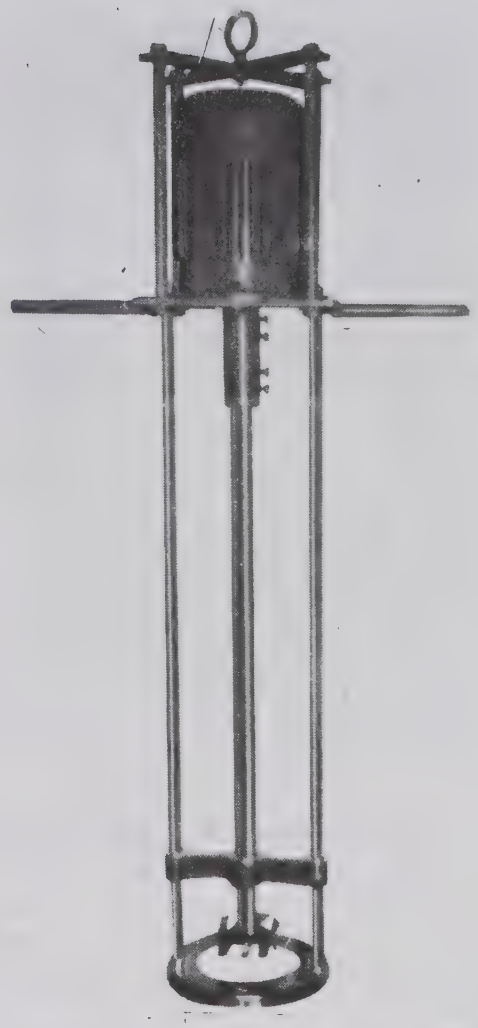
Ishita Extrusions (P) Ltd., are leading manufacturers of coextruded Multilayer LD/LLDPE film printed or plain. The product finds application in packaging of mineral water, liquid milk or any other free flowing liquid in poly pouches on AFFS Machines.

The material processed on latest plastic extrusion line has good optical, barrier and sealing properties. The printing is done on Rotogravure printing machine, by using FDA approved inks. Their especiallity is in manufacturing optically bright poly film for packing mineral water. Special purpose inks developed by the company does not peel off even after storage of mineral water pouches in deep freeze conditions.

For further details, contact:

M/s. Ishita Extrusions (P) Ltd.
Plot No. 8-A, Industrial Area
Govindpura (BHEL)
Bhopal – MP
Tel: 0755-261273, 272109 • Fax: 235310

STIRRERS



COSYWO has developed profit boosting design of **Stirrers,** equipments and machinery considering Operational convenience time saving, labour saving and trouble solving problem with guarantee for Performance, Dependebility and less breakdowns. The commitment to product development and improving process knowledge is continuous.

COSYWO's objective is perfect job, expertise, quick Service, superior quality and fulfilment of its responsibilities to customers. They provide guaranteed solution for mixing problems.

COSYWO has vast experience in modifying/modernising/manufacturing customs built **Stirrers** with excellent workmanship. No matter how small your mixing need or how large and complex you can mix with the best.

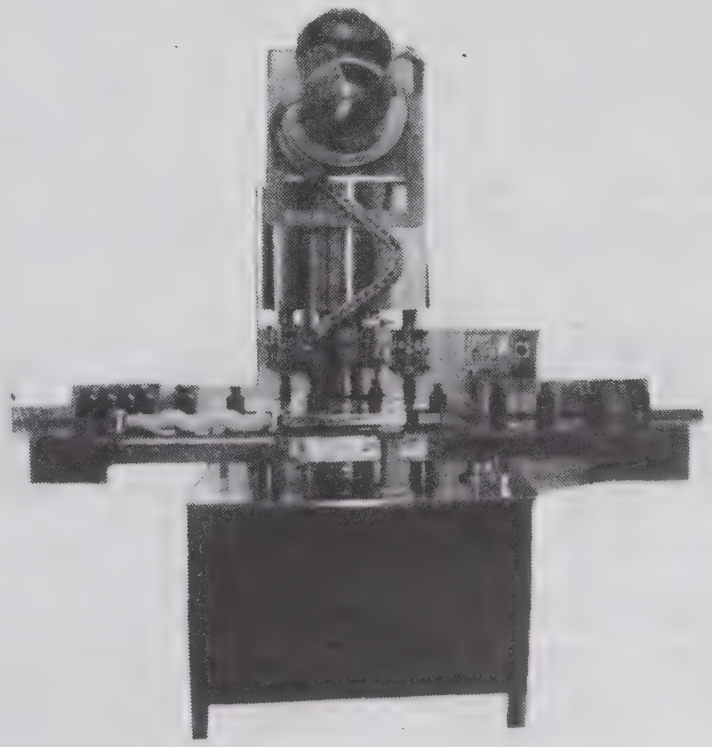
COSYWO is specialist of Rubber Sleeve Expander • Roller for Textile Steel Plastic Aluminium foil Leather cloth and Paper S S Guide Roller • Batching Roller • Cloth scutcher • Gum Mixing pans • S S size mixing tank • Water Line Sand Filter Lab Mangle • S S Poteye • S S Ager Patti • Farakadi • Reaction vessels • Ball Mill • All products are manufactured in well equipped workshop vigorously tested and precisely inspected to achieve desired results.

They are leading manufacturers since 1960 for Stirrers • Agitators • Emulsifiers • Dispersers • Homogenisers • Disintegrators • Attritors • Conical Blenders.

For further details, please contact:

Cosywo™ Engineering Company
15, Laxmi Co-op Industrial Estate
Near Nagarvel Hanuman Mandir
Amraiwadi Road
Ahmedabad 380 026
Telefax (O): 91-079-2748168/2748001
Email: cosywo@usa.net
Website: www.indianic.com/cosywo

PHARMACEUTICAL MACHINARY



Vikram Engineering company are manufacturers of machines for the Pharmaceutical, Food and Beverages Industries.

The wide range of machinery for the injectable powder and liquid filling unit includes • Automatic Injectable Powder Filling and Rubber Stoppering Machine • Automatic Injectable Liquid Fillng and Rubber Stoppering Machine • Automatic Four Head Aluminium Cap Sealing Machine • Automatic Four Head Ropp Cap Sealing Machine • Automatic Labelling Machine for flat and round container • Automatic Sticker Labelling Machine for flat and round container The company also manufactures as per consumer requirement.

For further details, contact:

Vikram Engineering Co.
Plot. No. 1806, Phase III,
G.I.D.C.
Vatva, Ahmedabad 382445
Telefax: (O) 91-079-5830388
Email: vikramengco@icenet.net

STACKED RING FILTERS

Kumar Process Consultants are manufacturers of stacked Ring Filters, ideally suited for clarification of Sugar Syrup, Honey, Wine, Beer, Fruit Juices and Pharmaceutical products. Filter is made of a shell fitted with filter elements formed by stacking of specially designed rings on a machined rod to form a cylinderical porous structure which is rigid having a flow volute on the internals. These elements are coated with filtered to form a sturdy and porous filter bed. The fluid which is to be filtered is passed through this and the filtered fluid in taken to collection tank or for down stream processing.

The stacked filter ring is compact, requiring no consumable spares. It is made of SS316 and Sealing gaskets in Silicon, PTFE and viton to with stand hot water sanitization or stream sterilization. Unit does not need to be dismantled for cleaning.

For more details, contact:

Kumar Process Consultants & Chemicals Pvt. Ltd.
230/4, Ashoka House,
Behind Hotel Sheetal Arch
Linking Road
Bandra (W), Mumbai 400 050
Telefax: 6451964, 6420637, 6432512
Email: kumarfil@vsnl.com

CANDYPACK

Pack-age systems are manufacturers of low cost packaging machine. The company manufacturers a large variety of Automatic and Semi-automatic Form Fill and Seal machines for solids, liquids and powders.

Candy pack from Pack-age systems is used for packing various liquids like syrups, Sherbats, juices, water, liquid blue, liquor etc. in polytubes/bags and various free flow solids like sugar, tea, salt, detergent, spices etc. in small pouches. • Mechanical/pneumatic • Also available in double head.

Fill ML/GMS	:	20 to 150 (3 models)
SPEED	:	800 to 3000 Nos./Hr
BAG W MM	:	20 to 75
L MM	:	25 to 250 (As per product)
FILM WIDTH	:	2 x Bag Width 16 TO 25 MM
SIZE MM	:	750 L x 1050 W x 1950 H
POWER	:	230 V AC1Ph 50 Hz 3KW

The company also manufactures Liquivend, Liquipack, Ultrapack, Panpack, Autopack, Auger/Weigh Auger, Milkopack, Piston Filler, Unipack, Foot Sealer, Auto Sealer Machines.

For further details, contact:

Pack-Age Systems
24, Anant Colony
685/3, Bibvewadi
Pune 411037
Tel: 91-20-6834293 • Fax: 4216755
Email: package54@rediffmail.com
Website: www.package-systems.com

RUBBER COMPONENTS

Harkesh Rubber Industries is located in the commercial capital of India. They are manufacturers of procession Rubber Components like 'O' Ring for K.G. Trap and Unscambler Machine, Gasket for Lager Tank, Syrup Starting Tank, D-Airated Vessels Schenk Filter & P.H.E. Gasket, Diaphragms for Krones Regulator Valve and Solonoid Valve, CIP System, Kit for Forklift Priority Valve, P/S Cylinder and Plant Cylinder. They have also developed imported substitute rubber parts like Vent Tube Skirt, Liquid Seal, Bottle Seal, SMS Ring, IDF Union Gasket, Triclover Seal, Butterfly Valve Seal, Pet Bottle Rinser Gripper Pad, Orifice Gasket, mainly for Simonazzi, KHS, Krones, Kettner and Rita Filling Machine, Filter Press, Carbo Cooler, Homogenizer, Intermix, Bottle Washer, Crate Washer.

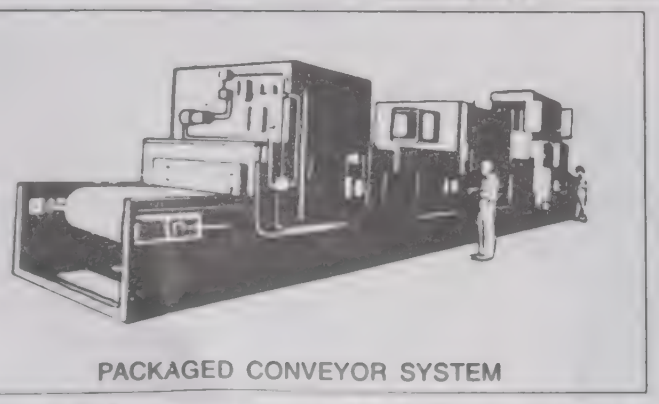
The Moulded Rubber Components manufactured are eloquent testimonial to the quality manufacturing since 1981.

For further details, write us:

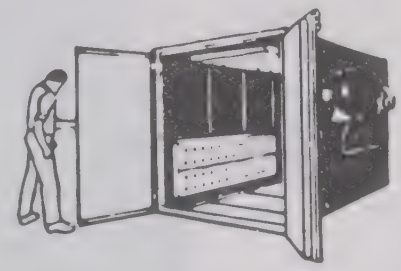
Harkesh Rubber Industries
106, Madhu Industrial Estate
Mogra Pada
Andheri (East)
Mumbai 400069
Tel: 8364847, 8393337
Fax: 022 8210414
Email: harkesh1@hotmail.com

SAKAV FOOD MACHINES

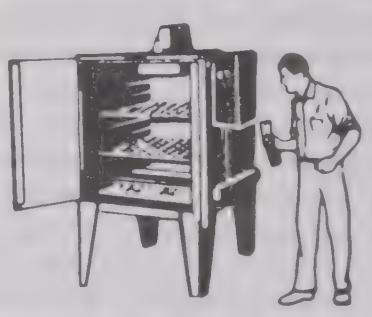
FRY — DRY — ROAST — TOAST — GRILL — BAKE — COOK
BLANCH — BOIL — STEAM — DEHYDRATE — FREEZE



PACKAGED CONVEYOR SYSTEM



WALK-IN



LARGE CAPACITY BENCH

SAKAV

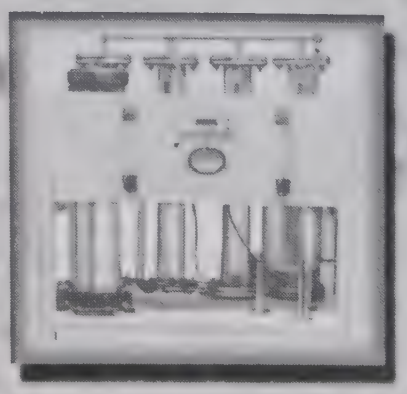
OVENS - DRYERS - FRYERS - GRILLS - BOILERS
IN ELECTRIC, LPG, DIESEL, STEAM CUSTOM - BUILT STANDARD MACHINES

SHIRSAT ELECTRONICS

133, Dewan Indl. Estate No. 6, Navghar,
Vasai Road (East), Dist. Thane - 401210. INDIA

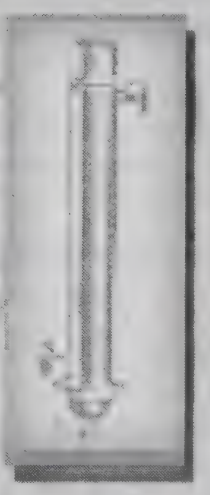
Tel: 91-250-392946 From Mumbai: (912)
Telefax: 91-250-390793 • Email: sakav@vsnl.com

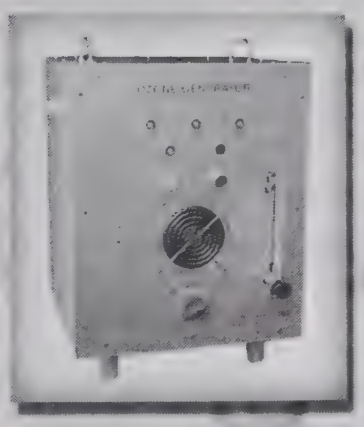
WATER Purification Systems



Drinking Water / Mineral Water Mfg. System :
KOMAL Drinking water systems offers leading edge Reverse Osmosis technology and perfermance within a compact, economical unit. KOMAL'S three stage process utilizes a reverse osmosis membrane and pre-and-post filters. These high performance systems are dosigned for use in a wide variefy of applications. Production capacities range from 100 lit/hr to 5000 lit/hr. Convert Brakish/Salty Bore-Well water to water confirming to Drinking Water Standard free from Bacteria, Viruses, Suspended impurities and Organics.

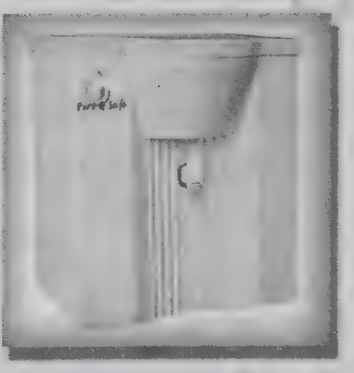
Ultra Voilet Disinfectant:
High intensity Ultraviolet water Disinfection with 30000 microsiemens/cm2 Dosage. Komal builds the right UV Disinfection models for a wide range of flow rates for disinfecting procen water and variety of valuable options and performance features, available. It's a class by itself.





Ozone Generatar :
Ozone has emerged as the most efficient and ecologicailly sound oxident and biocide to treat both air and water. Komal can offers a wide selections of Ozone equipments with Corona Diacharge Technology. The elegant, simple designis engineered for minimum maintenance Ideal for Botlled Water, Process Water and Portable water application having different capacities to suit your requirements.

Home RO :
Your's singal water treatment system for the complete removal of the wide variety of contaminants that might be present in drinking water. It's a process similar to that used to produce bottled water, and is presently, the most effective technology known for the improvement of drinking water.
Now you don't have to accept anyhing less than sparkling clear, great tasting, water to drink and cook with.



MANUFACTURER AND EXPORTER :

Komal

Water-So Pure & Safe

KOMAL INDUSTRIES
108, Creative Ind. Center, 12 N.M. Joshi Marg,
Lower Parel (E), Mumbai - 400 011, India.
Tel.: 91-22- 309 1174 / 309 1090,
Fax: 91-22- 306 2711,
E-mail : kcc@giasbm01.vsnl.net.in

ALL METAL SEPARATOR

S+S all metal separator 'Rapid Compact' separates all ferrous and non ferrous metals starting from a size of 0.3 mm from free falling material. This avoids costly failures of processing equipments and increases productivity. It is used both for intermediate testing in the process and also for final packed product . Thus, it ensures quality, productivity and safety.

The Rapid compact is suitable in various industries such as food, chemical, pharmaceutical, plastics and textile. The decisive advantages of the Rapid Compact All Metal Separators are: • Extremely low overall height • Proven and reliable function over the years of operation • Automatic self balancing • Permanent self monitoring • Temperature compensation • On-line working • Type of protection: IP 65.

The additional facilities such as anti-static scanning pipe, remote control unit, warning blinker and reset facilities are also available as per customers requirements.

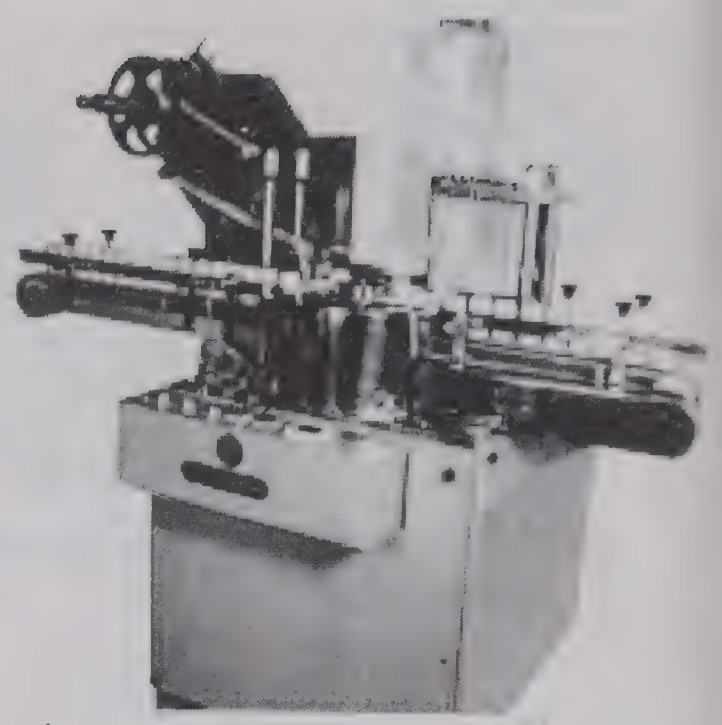
For further details, contact:

Rieco Industries Ltd.
1162/2, Shivajinagar
Behind Observatory
Pune 411005
Tel: 0212-5535215/5384 • Fax: 5533229
Email: package@rieco.com

FOIL SEALING MACHINE

This sealing machine from Jet Pack Machines can be used for sealing the neck of PET/HDPE containers. The purpose for sealing is to prevent the product inside the container from pilferage or losing aroma, characteristics etc. The machine accommodates different type of foils like Aluminium Poly/ Paper Poly/Lacquer Coated Paper etc. The machine can give speeds of upto 70 seals per min. depending on the size of the container and the weight. This machine finds application in Masala(chilli powder, hing, readymade masala etc), Glucose Powder flow wrap or any other hygroscopic powders, Pharmaceutical powders, Adhesives etc. The machine can be connected to filling as well as capping machine.

Other machines manufactured by Jet Pack are: Semi Automatic and Automatic (Single and Twin Head) Powder Filling Machine, Semi Automatic and Automatic (Single and Twin Head) Cream/Paste filling Machine, Automatic Capping and Cap Pressing Machine, Automatic Flow Wrapping Machine, Automatic Bottom Coding Machine, Automatic Composite Can Filling/



Sealing machine and Special Purpose Machine.

For further information, contact:

Jet Pack Machines
C-18, Nand Jyot Indl. Est.,
Safed Pool, Andheri Kurla Road,
Saki Naka, Mumbai 400 072.
Tel: 91-22-8516489/8515561
Fax: 91-22-8516489
Email: jetpack@vsnl.com

CLEANING TECHNOLOGY FOR AGRO INDUSTRIES

Goldin (India) Equipment Pvt. Ltd., Vadodara (Gujarat) has acquired design, technology and experience in cleaning technology - a primary process in post-harvest operations of seeds and grains. No food is manufactured without cleaning of seeds and grains coming from farms or markets. Today's food standards demand highest purity in cleaned product, after removing various kinds of impurities. Unfortunately shapes, sizes and varieties of impurities in seeds and grains differ so much that it requires specialized operations and equipment. Goldin has this requisite expertise not only in technology from America and Europe but also in indigenious manufacture of robust and dependable machinery. Goldin machinery has been working successfully, for the last two decades, on Soyabean, Groundnut, Rapeseeds, Sunflower, Barley, Wheat, Rice, Pulses, Spices like Black Pepper, Coriander, Cumin Seeds, Celery Seeds, Poppy Seeds, Fennel, Dill Seeds, Fenugreek, Chilli Seeds, Sesame Seeds etc.

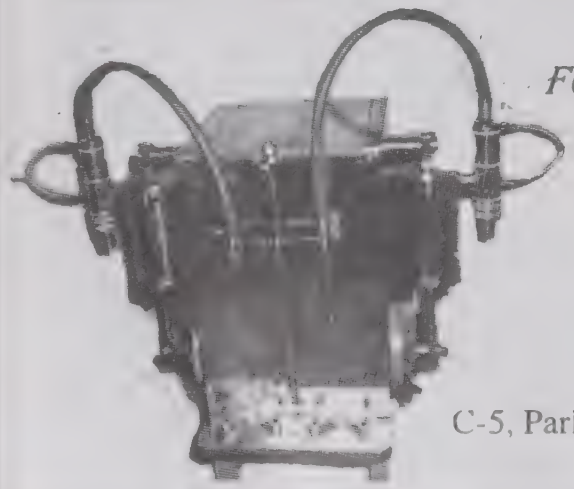
R & D pilot plant at Goldin factory, facilitates clients to observe efficient cleaning operations, before purchase of machinery. Not only this. Goldin also undertakes supply of cleaning and grading plants on turn-key basis for any agro crops. Goldin is a single source supplier with performance guarantee.

For further details, contact:

Goldin (India) Equipment Pvt. Ltd.
F/29, B.I.D.C. Industrial Estate
Gorwa
Vadodara 390 016
Tel/Fax: 0265-280168, 280461
Email: sales@goldinequip.com
Website: www.goldinequip.com

CHHAYA ENTERPRISE

Volumetric Filler



Manufacturers of

FOOD & BEVERAGES MACHINERY

Specialists For:

SYRINGES, LOBE PUMPS

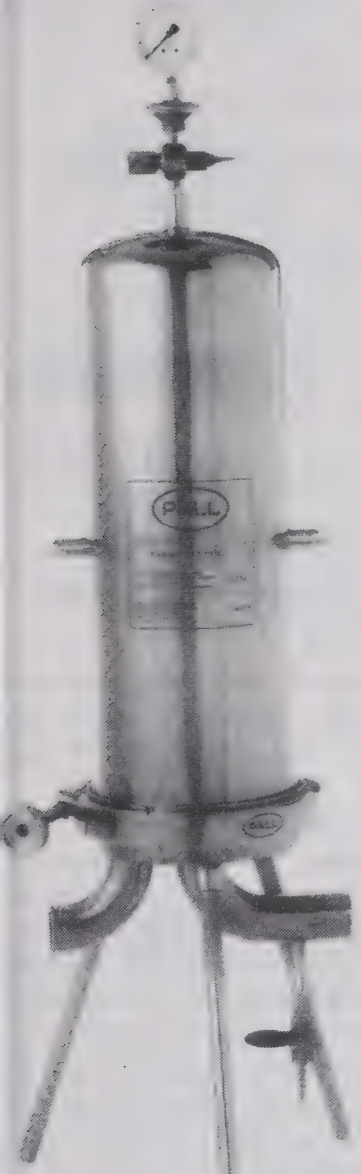
&

MACHINERY SPARE PARTS

C-5, Parle Colony, Sahar Road, Vile Parle (E), Mumbai 400 057
Factory Tel: 832 9259, Resi: 820 5584

Colloid Mill

Filters And Filtration Systems



Now available, special filters, filter cartridges and SS filter housing for Industrial, Pharmaceutical and Food and Beverage Industry.

The latest in the range are the Pall Cartridges from USA. The Polypropylene cartridges

(a) PROGARD

(b) PROFILE II FILTER CARTRIDGE

(c) ULTIPLEAT

Pall Progard : Excellent high performance polypropylene non-woven filament cartridges. Stable upto temperature of 82 degree Centrigrade, and do not shed fibres or allow particles to by pass.

Available in lengths from 10 inches to 30 inches and with micron rating of 1, 5 and 10 microns. Applications in Food, Beverage and mineral water industry

Pall Profile II Filter Cartridges : Continuously graded depth polypropylene fibre cartridges. Profile filter have High dirt retention capacity long life, no media migration and available in micron ratings from 1 micron to 90 micron.

Pall Ultipleat Profile Filters : Polypropylene pleated cartridge having crescent-shaped pleats with wide ranging filtration application.

The cresent shaped pleat structure allows more filtration area to be incroporated. Available in length of 10 inches to 30 inches and in micron ratings from 0.2 micron nominal to 50 micron nominal pore sizes.

CALL NOW

Shah Brothers

C-32, Wadala Shriram Indl. Premises Co-op. Soc. Ltd.
3rd Floor, 13, Ambekar Marg, Wadala, Mumbai 400 031.
Tel.: (022) 411 8872, 411 8874, 411 8875; Fax: (022) 411 8869
E-mail: shahbros@ bom5.vsnl.net.in

HOT-MELT LABELLERS

Labelling precision is not a question of coincidence but a question of optimum machine engineering equipment. KHS Anker is setting the standards for wrap-around labelling in the 4,000 to 45,000 bottle or container per hour capacity range with a new generation of hot-melt labellers for the beverage and food product trade.

This new Innoket Roland HS hot-melt labeller is predestined for increasingly popular non-returnable PET bottles. At the same time a widest possible variety of packaging shapes and types can be processed. Whether cans or canning jars, cylindrical containers, or contour containers - the Roland HS can label them all. All that is required for labelling various packagings are different format parts adapted to the shape of the packagings.

Fast format part changeover is part of the Innoket Roland HS program. All format parts can be replaced without tools by mean of quick-change devices.

The Innoket Roland HS is available in seven different sizes with capacities ranging from 4,000 to 45,000 bottles per hour. The smallest model with 10 bottle turrets and a reference circle of 640 mm is designed for an output capacity of 4,00 to 15,000 bph. The largest machine, equipped with 32 bottle turrets and a reference circle of 1,060 mm, is capable of producing an output of up to 45,000 bottles per hour.

For further details, contact:

KHS Maschinen - und Anlagenbau
Aktiengesellschaft
Juchostr. 20
44143 Dortmund
Tel: 49231569-1339
Fax: 49231569-1226

CONVEYOR BELTS

The food industry demands belts that meet stringent quality standards. Continental Belting, prides in producing belts which not only meet but surpass these standards. They provide belts for all possible applications. Their belts are available in PVC, PU, PE, Rubber (both synthetic and natural), Neoprene and Nitrile. The range of fabrics includes Nylon, Cotton, Polyester as well as a host of special application fabrics. Standard widths range from 50mm to 2000mm and thickness from 1mm to 5mm. Also available are coated and non-woven conveyor belts.

For further details, contact:

Continental Belting Company Limited
Commercial Chambers
101, Old Rajendra Nagar Market
New Delhi 110060
Tel: 011-5757334/2904 • Fax: 5752904
Email: stallion@nde.vsnl.net.in

FLYING INSECT CONTROL SYSTEM

Electric flying insect traps, utilising ultraviolet (UV) as the main attractment, have been around for along time now and over the years the many refinements to the basic concept have been wide and varied.

Pest Control (India) Pvt. Ltd. have done meticulous research and developed the Spider™ flying insect control system which is completely safe, hygienic and economical and is built and approved to the highest international standards. It employs no harmful chemicals or pesticides, just applied scientific design into the use of shape and colour to outperform by a huge margin, all its rivals.

The Spider's unique features are now protected by world-wide patents.

UVA tubes attract flies into the unit where they are held permanently and intact on two specially formulated control boards which constitute a 215 sq.in., catch area. Incredible for such a compact unit. These control boards, which are black to disguise the catch, are easily removable for hygienic disposal. There is no added risk of fragmentation or blow-out normally associated with high voltage models and definitely no "Zap", making Spider™ very discret.

For added discretion, an optional screen is available. This is situated between the tubes and the control board shielding the catch from sight without diminishing the efficiency of the system.

The unit is supplied with three UVA tubes for maximum degree of attraction. It can be wall mounted or free standing on counters or worktops. The lightweight ABS body and click-on cover ensure easy handling and servicing.

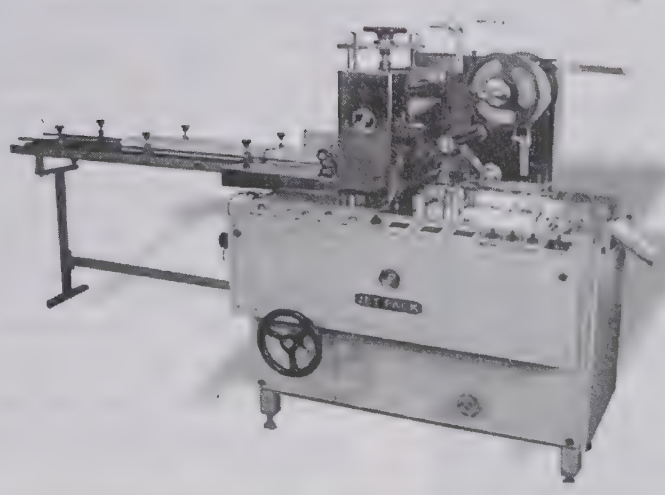
Just like its namesake that traps insects on its web, Spider™ attracts and traps flying insects silently, continuously and permanently.

For further details, contact:

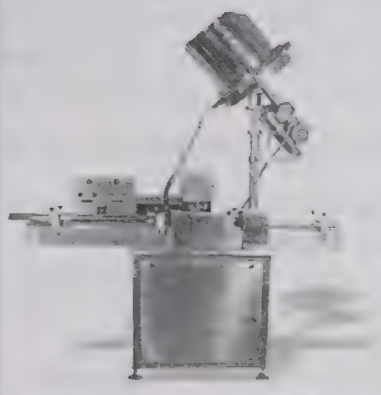
Pest Control (India) Private Limited
127, Keytuo Industrial Estate
220, Kondivita Road
Andheri (E), Mumbai 400 059
Tel: 821 35 46/47, 832 84 81
Fax: 9122-822 16 47
Email: pcilho@vsnl.com

JET PACK

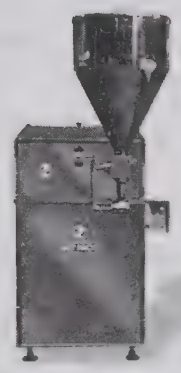
Mfgr. of Packaging Machines for Food, Beverages, & Pharma Industries



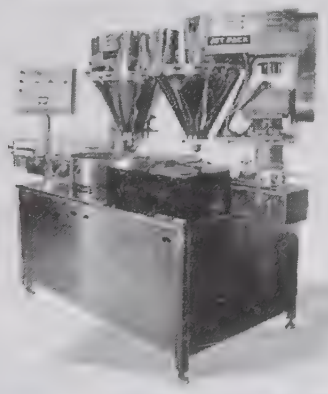
Food Products cartons premixes cartons overwrapping M/c.



Cap Pressing Machine



Cream Paste Filling Machine



Semi Automatic & Automatic Powder, Spices & Masala Filling

Other Ranges of Machines from JET PACK

- Powder Filling Machine
- Cream Filling Machine
- Volumetric Cupfiller
- Liquid Filling Machine
- Capping Machine
- Rotary Sealing Machine
- Automatic Carton Over Wrapping Machine
- Horizontal Flow Wrapping Machine
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- Aluminium Foil Sealing Machine
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- Insert Pressing and Sealing Machine

For Details Contact

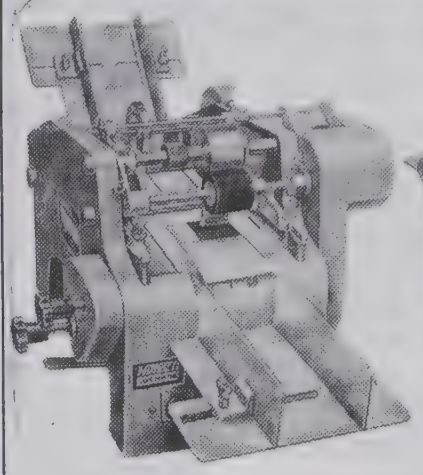
JET PACK MACHINES

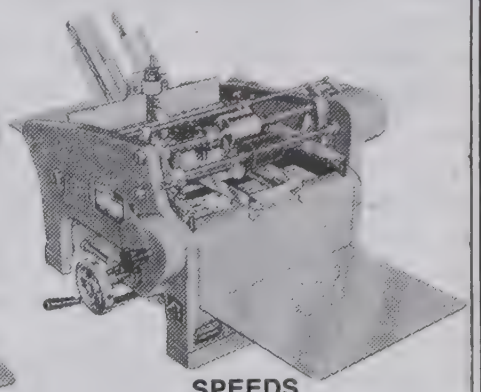
C-18, Nandjyot Indl Estate, Safed Pool, Kurla-Andheri Rd, Sakinaka, Mumbai - 400 072. Tel: 851 6489 / 851 5561 / 856 0800
Fax: 851 6489 Email: jetpack@vsnl.com

ATTENTION TO PHARMACEUTICALS - COSMETICS DAIRY - FOOD & BEVERAGE INDUSTRIES

NIMACH BRAND FULLY AUTOMATIC HIGH SPEED LABEL CODE PRINTING MACHINE TYPE A U 1

CARTON PRINTER MACHINE TYPE A U 2





SPEEDS
125/180/250
LABLES - CARTON / MINUTE

SIZE OF LABELS
200x150 m.m. max.
50 x 25 mm

STEREOS & METAL LETTER PRESS TYPES CAN BE USED

SIZE OF CARTONS
325x125 m.m. max.
90 x 50 m.m. mini.

PLAIN, LOCKED BOTTOM CARTONS CATCH COVER CAN BE PRINTED.

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NIMACH ENGINEERING CO.

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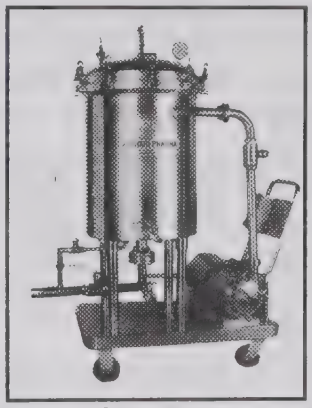
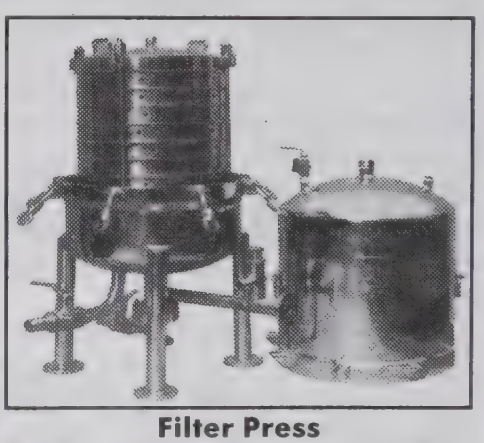
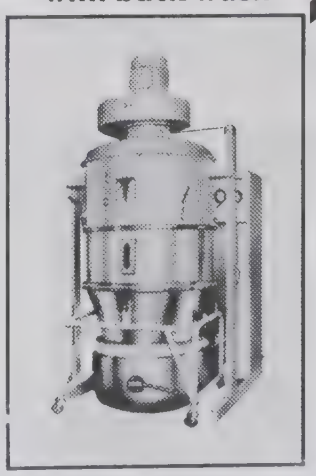
Kns.Adi.



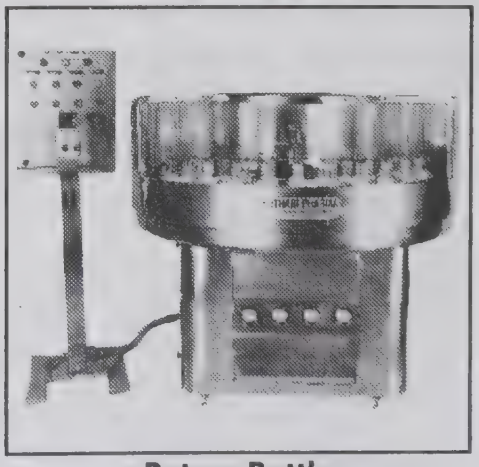
Filter Press standard model with back wash



Filter Press Zero hold up (Reverse flow) with back wash



Fluid Bed Dryer



Rotary Bottle Washing M/c.

kothari pharma

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E-mail : chandrakant@kotharipharma.com Website : www.kotharipharma.com
Offices : Ahmedabad, Bangalore, Delhi, Hyderabad, Indore, Bangladesh.

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Mech-Tech Industries manufacturing Polypropylene Filter Cloth having exception features like chemically inert to Acids and Alkalis, excellent abrasion resistance, Antistatic, High Tensile Strength, Specific Gravity 0.9. Moisture absorption less than 0.05%. Good Dimensional Stability. Non-Toxic, Antistatic, Working Temperature 100 Deg.C. Longer Life, user industries like Chemicals, Dyes, Pharmaceuticals, Cement, Starch, Oil, Sugar, Fertilizer, Aluminium, Electroplating, Rayon, Ceramics, Paint and Varnish etc. Readymade Centrifuge Bags, Nutches, Filter Press Pieces and Stitching facilities is also available as per custom's requirement.

For further details, contact:

Mech Tech Industries
B/52, Pariseema Complex
Opp. IFC Bhavan
C.G. Road, Ellisbridge
Ahmedabad 380 009
Tel: (O) 6409525, 6407292
(F) 2740302, 2730305
Fax: 91-079-6407292
Email: mtifilterfab@icenet.net

SPROCKETS WHEELS

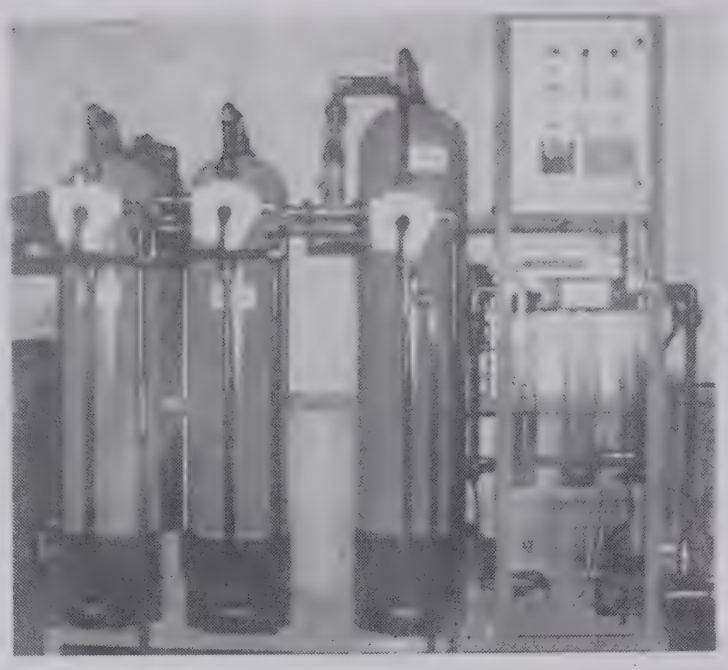
Meritt Roller Chain Sprockets are available from stock in sizes ranging from 6mm to 63.5 mm pitch BSS inclusive. All sprocket teeth are machined according to BSS tooth profile design for single and multiple strand roller chains. These sprockets are also available in cast iron, cast steel, carbon steel, stainless-steel etc., with and without flame hardening heat treatment as required.

Meritt also offers complete line of sprockets for conveyors and elevators. Cast tooth sprockets are generally used, however, flame cut or machine-cut sprockets can be furnished when required. These sprockets are also available in a wide-variety of material and are designed with rim and hub proportion that combine high strength with minimum weight.

For further details, contact:

Meritt Transmissions
157/159, Narayan Dhuru Street
Behind Nagdevi Street
Crawford Market
Bombay 400 003
Tel: 3444956, 3442857, 3428342
Telefax: 91-22-40788268
Gram: Seawizard
Email: meritttransmissions@vsnl.net
Website: merittransmission.com

PACKAGED MINERAL WATERPLANT



Aguapuro Equipments having complete range of water treatment equipments is concentrating more on Food and Beverage industry considering industry needs mainly in Mineral Water and Soft Drink/Soda (Carbonated Mineral Water) segment.

Their fully automatic, compact, skid mounted system, designed in technical guidance with MasterTech Equipment and Instrument Co. USA are custom designed for all type of water to produce water as per IBWA (International Bottled Water Association) and USFDA standards.

Specification: System is mainly consisting of • Chlorine and Alum Dosing Pumps • Raw Water Feed Pump of SS 304 • Multi Media Sand Filter • Granular Activated Carbon Filter • Water Softener Unit • Micro Filter Unit • Reverse Osmosis/Nano Filtration / Ultra Filtration Unit complete with High Pressure Pump, Pressure Tubes and Membranes etc. • SS Storage Tank for Storing water • 3 or 4 stage Micron Unit • UV Sterilizer & Ozonation unit etc.

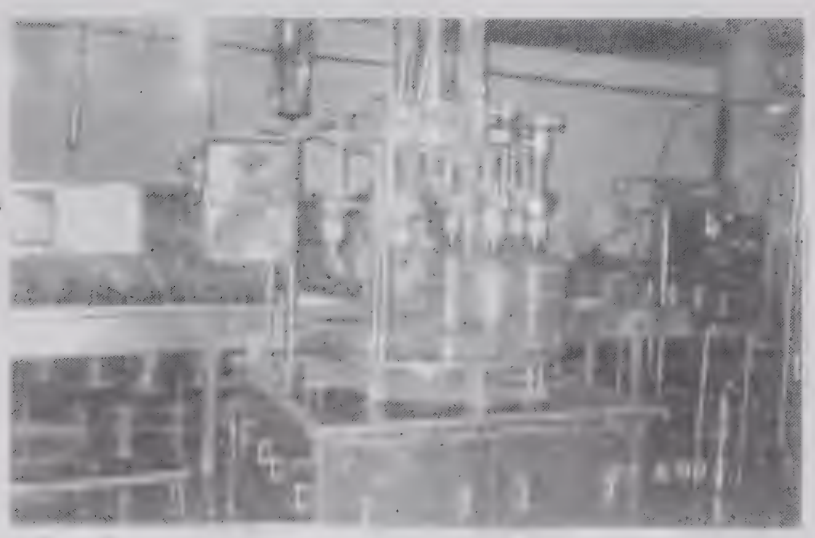
Capacity: Capacities are ranging from 200 LPH to 5000 LPH.

All the items used in for making systems are from Multi National world leader companies viz. Structural, North America, DP Pumps-Holand, Dow Membrance - USA, PTI Micron Filters - USA, Grundfoss Pumps - Denmark

For more information, contact:

Aguapuro Equipments
2/22, Panwala Building
Dr. S.S. Rao Road
Lalbaug, Mumbai 400 012
Tel: 4101432/4155576
Fax: 022-4155576
Mobile: 9821078929
Email: aguapuro@vsnl.com
Website: www.aguapuro.s5.com

FILLING MACHINES



Filpack Engineering Pvt. Ltd. are revolutionary developers of rotary gravity filling machines in India for PC/PET jars. The machines have an output of 8 to 24 jars per minute. The jars have the capacity of 18 to 25 litres.

The machines are conceived on Volumetric, Vaccumetric and Gravity filling system in fully Automatic and Semi Automatic Bottling plant. Filpack systems are used to fill bottles, vials, jars, plastic contains and PET bottles.

The Rotary Machines have the capacity from 20 BPM to 240 BPM for mineral water, soft drinks, pharmaceuticals and distilleries.

Filpack Engineering also manufactures • All types of conveyors, SS/M.S. Gravity Rollers, Packing belt and Inclined • Rinsing and Washing by linear, rotary and Soaker type, label removing, plastic crates washers by fully automatic equipments • Screw Capping Machines for Glass, PET Bottles, RO/ROPP closures

For more details, contact:

Fil Pack Engineering Private Limited
(Bottling & Packaging Engineers)
A-32, Phase-I
Industrial Area, Naraina
New Delhi 110 028
Tel: (O): 5893219 (R): 7552785/7503531
Fax: 01191-5791111
Email: filpackbottlingpackaging@engineers.com
nnarang@mantraonline.com

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For further details contact : ————

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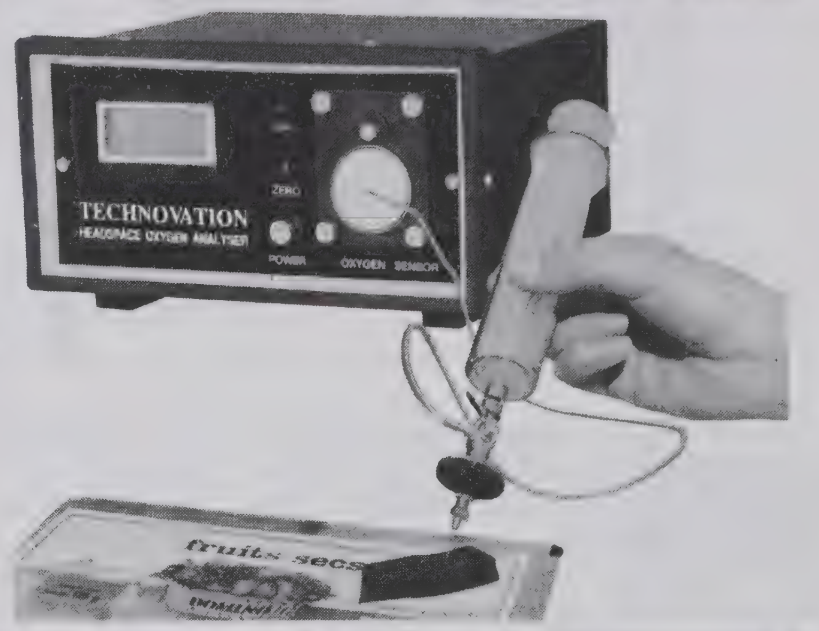
Veera Desai Road, Andheri (W), Mumbai - 400 053.
Tel.: 6327621 / 6318449 **Fax :** 6344083 **E-mail :** pamvi@vsnl.com

TECHNOVATION MAP HEADSPACE OXYMETER MODEL EC-500

MODEL EC-500 CAN CHECK THE % OXYGEN INSIDE FOOD PACKAGES



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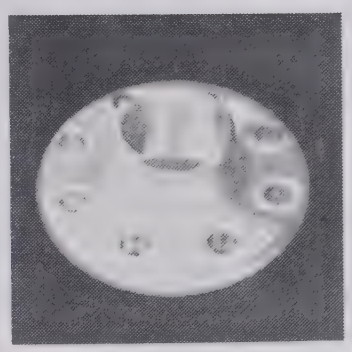

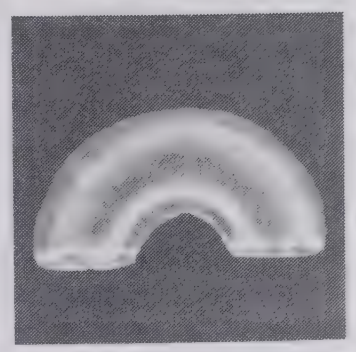

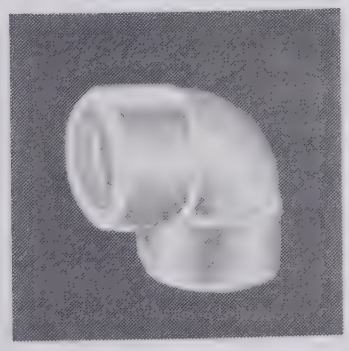

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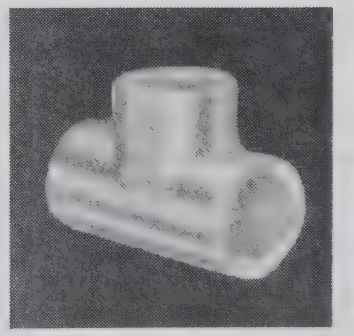
Serving Leading Large Industries & Government Departments



STEINEL HOT AIR GUN HL-1400 S

Pamvi offers a light weight multipurpose Steinel Hot Air Gun HL-1400 S from Steinel – Germany, worlds largest manufacturer of Hot Air Guns and an ISO Certified Company. This economical model comes with two stage temperature control (300°C and 500°C with corresponding airflow of 240l/m and 450 l/m respectively) and an output of 1400 Watts. Its pistol type handle gives super grip for tireless working.

Typical applications of this Hot Air Tool are • Shrink packaging of the food packets and parcels • Shrink Wrapping of food packages, plastic film, postal parcels, etc. • Shrink fittings of corks on the bottles containing sauces, jams, etc. • Thawing out refrigerators and freezers • Sterilisation of kitchen utensils, crockery and cutlery with hot air • Defrosting of the ice-compartments • Heat shrinking of shrink films, labels and sleeves for bottles • Heating the Roller of a bakery machine to prevent pastries from sticking • Heat creme's chocolates and marzipan's from all sides for perfect pastries and cakes • Drying of adhesives etc. • Welding of PVC tanks and chemical storage tanks made of thermoplastics • Releasing old rusted nuts and bolts, fitted carpeting, PVC flooring, wall paper, etc. • Many other general applications.

The company also provides heavy duty models for industrial and professional applications.

For further details, contact:

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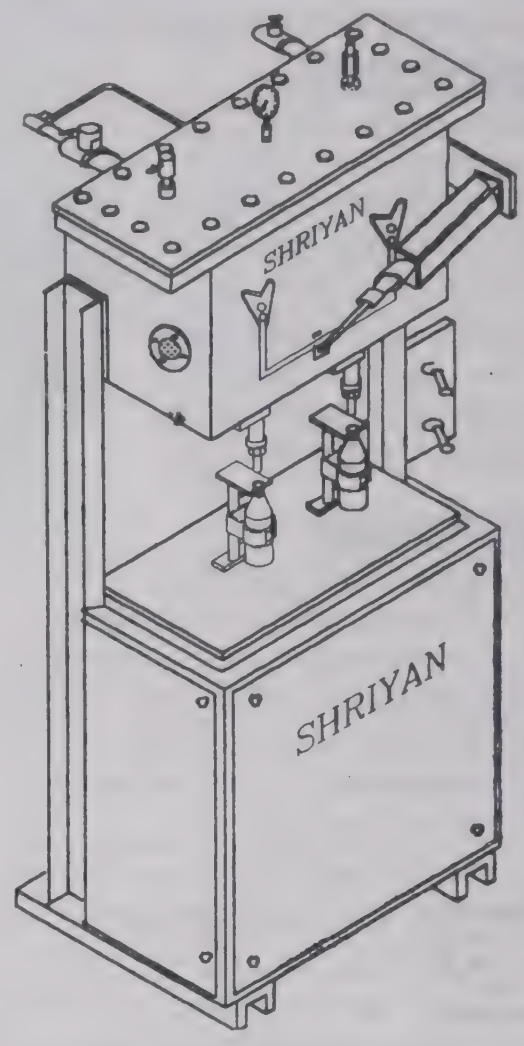
9, Shah Indl. Estate
Off Veera Desai Road
Andheri West, Mumbai 400 053
Tel: 91(0)22-632 7621/7294, 6318449
Fax: 6326280, 6344083
Email: pamvi@vsnl.com

COUNTER PRESSURE (SEMI) FILLING MACHINE



Shriyan Enterprises are manufacturers of carbonated and non-carbonated packing machinery. They also manufacture counter pressure (semi) filling machines which are used for filling soda/soft drink in pet/glass bottle in various size from 250ml to 2500ml.

For more details, contact:

Shriyan Enterprises
B/5, Gr. Flr
Ghanshyam Industries Estate
Veera Desai Road
Andheri (W), Mumbai 400 053
Telefax: 6368320/28
Tel: 6369057/6368328
Email: shriflow@vsnl.com

INTEGRATED POWDER PACKAGING LINE

Recon has developed fully automatic powder filling line with clinching, vaccumising, Gas flushing system to increase shelf life of nutricitional food.

Automatic vaccumising and Gas flushing system designed and manufactured by us is a major break through in packaging technology in India. This is suitable for plants packing Milk food etc. in metal cans. We are the first to develop and manufacture this system in India to serve food industries. The system has its own unique advantages like longer shelf life, freshness of the products, retention of flavour etc. The system consists; • Filling operation • Clinching • Vaccumising and Gas flushing • Final seaming

System's operation

Filling : The filling of the product can be done on our powder filler model PFM-2, Empty cans are presented to the unscrambler in upside down position and are cleaned with hot air jet. Cans are then fed to filling stations, through magnetic turnover system. Filling machine is provided with twin head Augur dozer and hoppers. A continuous stirring arrangement in the hopper helps to maintain bulk density of the product. Dispensation of powder is affected by rotation of the augur which is controlled by combination of magnetic clutch and brake with electronic counter. This combination ensures easy and accurate filling. Automatic plastic spoon dispensing is optional in the system.

Clinching: Our automatic seamer model RSM-2L is used for clinching operation. Filling cans are transferred on intake conveyor of the machines and further transferred for clinching operation with specially designed jerk free devices. An automatic end feed attachment is provided with this machine to facilitate smooth and trouble free presentation of the end from the stack to clinching station. The clinching is completed in two operation, I and II with 2 rollers for each operation. The groove on the roller is designed to meet International standards. The machine is provided with interlocking arrangement i.e. **NO Can - No End, No End Machine stop.** This ensures no damages to the filled cans.

Vaccumising and Gas Flushing; Powder filled cans are received on the input conveyor of automatic clincher model RSM-2L. After clinching the cans are conveyed in a single file via an output conveyor to the twin chamber vaccumising and nitrogen flushing VGL-50. The two chambers receive the cans alternately from the input conveyor. Various functions of charging of the chambers, lowering of the hood, vaccumising in two stages nitrogen flushing lifting of the hood and discharge of cans are closely controlled for each cycle. Cans after discharge from each chamber alternately flows into the output conveyor for final seaming on RSM-2L.

A microprocessor based controller is used to control the various functions of the vaccumising and nitrogen flushing units. Controller guarantee preset levels of vaccum and nitrogen over pressure before releasing the cans from each chamber. If the preset conditions are not achieved the cans would not be released and warning signals by hooter is given. The line provided with requisite valves and pressure switches.

Rainbow
Roller Chains

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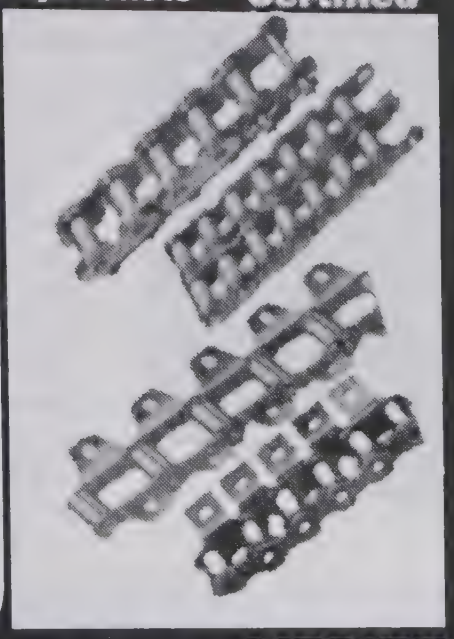

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Indian Snack food & Namkeen Processing Equipment

Innovative, inspiring solutions for Manufacturing of traditional Indian Snack foods using modern methods of Frying, Roasting, Drying, Blanching, Boiling and Cooking.

We offer guaranteed solutions to get excellent Indian Snacks Food Products of consistent quality, traditional feel appearance and taste like, Samosa, Kachori, Bakharwadi, Namkeen, Farsan, Chakli, Bhujia and Dankoli.

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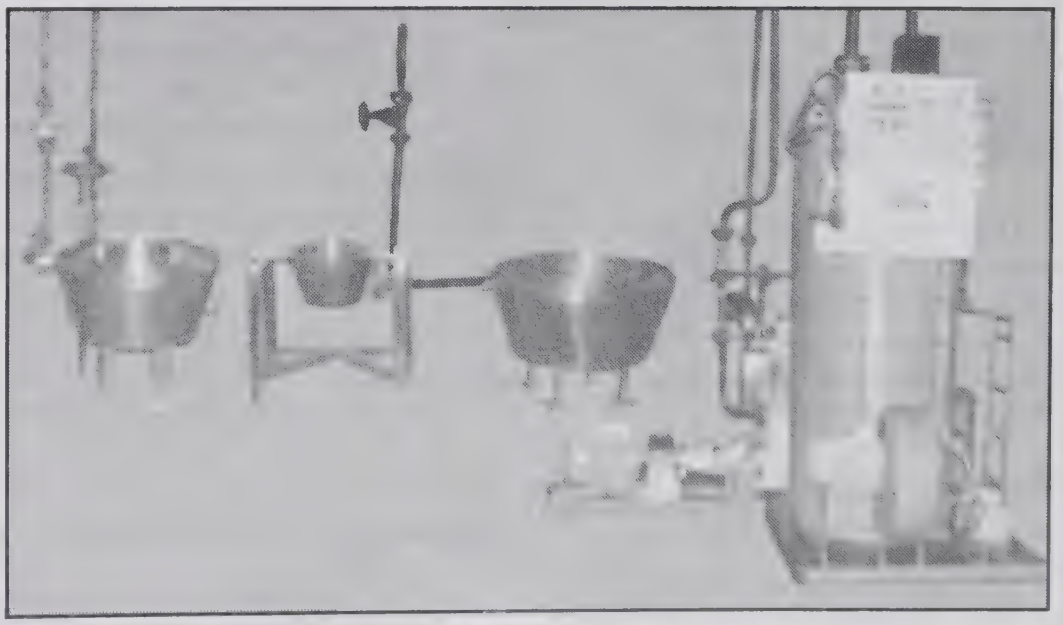
- YOUR INVESTMENT GETS RECOVERED WITHIN MONTHS
- 100% DEPRECIATION ALLOWED IN FIRST YEAR AS PER INCOME TAX RULES.
- OUR EQUIPMENTS ARE WORKING SUCCESSFULLY FOR OVER ONE DECADE.

Now first time available in India for Industrial Scale Manufacturing of Indian Snacks and Food like Samosa, Kachori, Bakharwadi, Namkeen, Farsan, traditional items like Chakli, Bhujia and Dankoli.



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Fax : 91-22-810 0348.
email : sadanandfoodmachines@rediffmail.com
Works : Shahapur, Bombay Nashik Road.

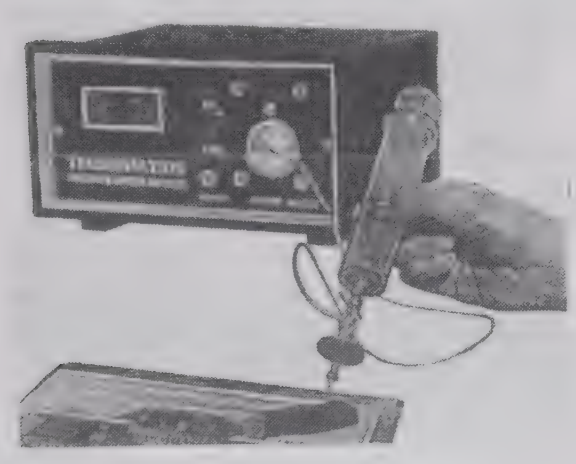
Seaming: this final operation in the system is done on seaming machine model RSM-2L. The can with Nitrogen flush are conveyed on the intake conveyor of the seamer and are seamed in two operation with two rollers for each operation. The seamed cans are finally collected on discharge conveyor for further packing.

For further details, contact:

Recon Machine Tools Pvt. Ltd.
37 Sarvodaya Industrial Estate
Mahakali Caves Road
Andheri (E), Mumbai - 400 093
Tel: 8324719, 8341753, 8343931/ 8344973
Fax: 8361074
Email: recon@bom3.vsnl.net.in
Website: http://www.reconmachine.com

GAS ANALYSERS

The Technovation Headspace Oxygen Analyser Model EC-500 has a specially designed sampling confirguration with a ultra-sensitive oxygen sensor that makes it feasible to accurately measure oxygen contamination in the headspace of a food package. Even if CO_2 is used as inert gas the Model EC-500 will be suitable to measure % oxygen in the CO_2 atmosphere or a nitrogen & CO_2 modified has mixture.



The Headspace Analyser incorporates an adapted hypodermic-type needle & small syringe to pierce the soft-food package & draw the gas into the syringe fitted with a locking arrangement to prevent loss of sample gas.

The sensor is highly sensitive and even as little as 10cc of sample gas is sufficient for obtaining highly accurate measurment. Calibration is accomplished conveniently by atmosphere air.

Models work on mains supply of 220V AC, 50 Hz. This handy instrument is available with digital readout 0.25% O_2 range and 0.1% oxygen steps with front adjustments for zero, calibration & sampling the headspace gas.

For further details, contact:

Technovation Analytical Instruments Pvt. Ltd.
204 Deccan Court, 259 S.V. Road
Bandra (W), Mumbai 400 050
Tel: 6431585, 6413288
Fax: 6402640, 6458870
Email: taipl@vsnl.com
Website: technovationindia.com

SOLID STATE INDUCTION CAP SEALING MACHINE

Packagers of Oil, Pharmaceutical, Pesticides and Food products all turn to induction cap sealing to solve their capsealing needs. Maintaining a tamper resistant, air tight and leak resistant seal on packaged goods is foremost for packagers concerned with preserving the integrity of their products. Electronics Devices induction capsealing system, empowers packagers to seal from 10 to 120mm closure sizes closure sizes at desired line speeds.

Induction Cap Sealing Machine were developed to cater to the requirement of the Packaging industry. There are several distinct advantages to induction sealing. • Tamper evidence — deter pilferage • Leak Prevention — No rejection, hence enhanced profits • Increased Shelf life — product freshness • Assurance to the end user — win your customers confidence • A sealed product is perceived to be safe and hygienic.

Electronics Devices is the original manufacturer of solid state induction capsealing systems. As the leading supplier of induction capsealing systems worldwide, out continued commitment to quality and state-of-the-art technology drives our research and development further into the further.

Electronic Devices have supplied this machine to many leading industries all over the country and have even exported them to Egypt, Nepal and Abu Dhabi. The customers include leading Oil Companies, Food, Pharmaceutical and Pesticides Industries.

Their machines are very rugged and reputed to give trouble free service. All the components are highly over rated to give continuous duty operation. These machines are designed for 24 hours a day, 7 days a week continuously operation.

The company offers a complete lab and test facility to test the materials for the most economical system, determine line speed capabilities and ensure the proper fit between the conveyor and the capsealing system.

For further details, contact:

Electronic Devices
31, Mistry Industrial Complex
M.I.D.C., Cross Road 'A'
Andheri (E)
Mumbai 400 093
Tel: 91-22-8221649/8394629
Fax: 8217443
Email: info@electronicsdevices.com
Website: www.electronicdevices.com

DIETARY FIBRE

Ankur Biotech recently developed a new dietary fibre rich vegetable powder, *Fibran*™, containing 87-91% of total fibre, with the ratio of soluble fibre to insoluble fibre ranging from 76% to 80%. In addition to nutritional benefits as dietary fibre, *Fibran*™ has useful properties as food ingredient, namely, water holding capacity in improving texture, freshness and quality of baked foods, synergistic effect on the rheological properties of various thickening agents like carbohydrate based derivatives, and all properties of anti-caking agents in preparation of hygroscopic dry food mixes.

For more information, contact:

Ankur Biotech
3/516, Kunrathur High Road
Madanandapuram, Porur
Chennai 602 101
Tel: 91-44-4828309/4827951/482953
Fax: 91-44-4825754
Email: ankurfpl@md4.vsnl.net.in

☆ ☆ ☆ ☆ ☆

Electronics Devices induction Capsealing system, empowers packages to seal from 10 to 120mm closure sizes at desired line speeds.

Benefits Of Induction Capsealing

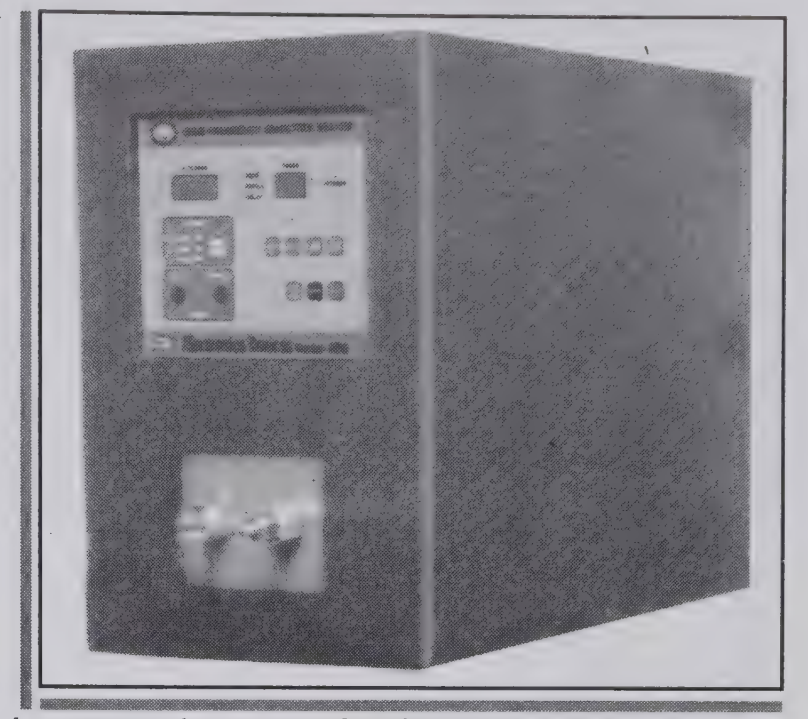
- Tamper evidence - deter pilferage.
- Leak Prevention - No rejection, hence enhanced profits.
- Increased Shelf life - product freshness.
- Assurance to the end user - win your customers confidence.
- A sealed product is perceived to be safe and hygienic.

The ED-VANTAGE

- Wide range of equipment's to choose from
- Latest solid state technology
- High, Medium & Low speed capsealers available.
- Portable models available.
- Customized solutions possible
- Lab test facilities available

Our Induction Capsealers are widely used in various industries such as

- Agrochemical
- Cosmetic
- Edible Oil
- Food & Beverage
- Lubricating oil
- Pesticide
- Petrochemical
- Pharmaceutical



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Electronics Devices

Works: 31, Mistry Ind. Complex, M.I.D.C.,
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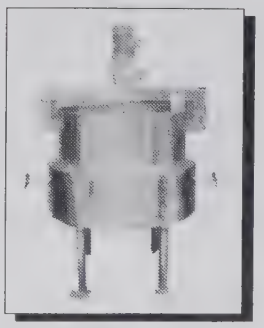
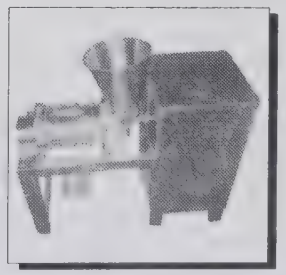
Email : info@electronicsdevices.com ● edee@bom3.vsnl.net.in
Website:electronicsdevices.com

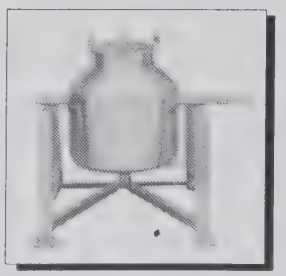
Ultramodern Machines for the new millennium

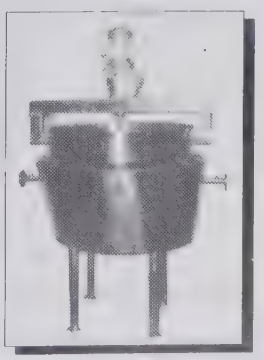
we have been manufacturing machines for the sweet meat manufacturers for the last 14 years.

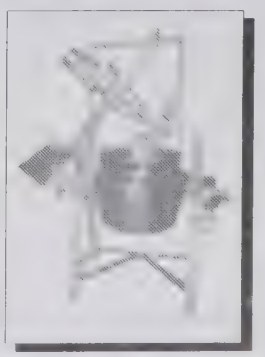
- Mawa/Khoa making machine
- Rasgulla making plant
- Combined Rasgulla & Mawa/Khoa Plant
- Kaju Barfi making Kettles
- Continuous Shrikhand Making machine
- Basundi Making Machine

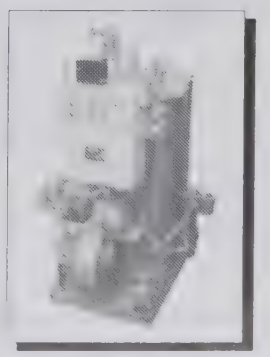










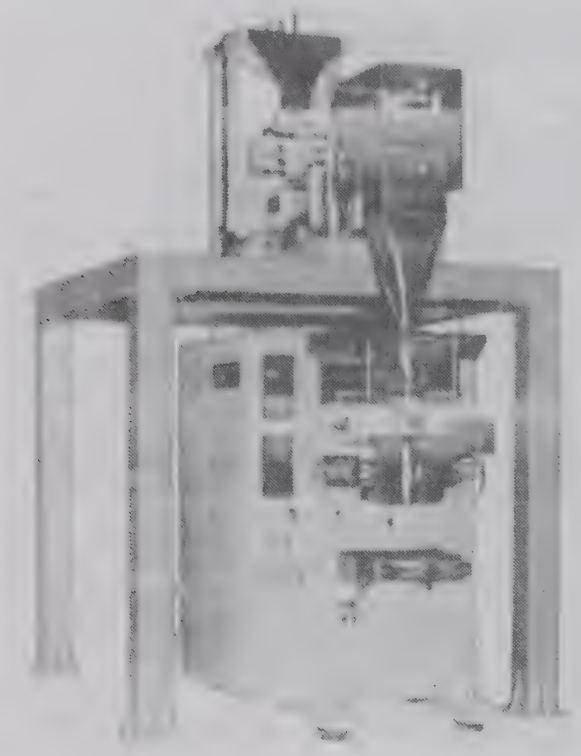


Malhar Industrial Associates

Regd. Off.: B-3, Harish Ind- Compound,
Royal Collage Road, Penkar Pada
Mira Road (East),Dist : Thane 401104
Phone: 6902332 • Fax : 8100348
Email : malharsweets@vsnl.net

Fuel consumption gets reduced by 50%
100% Depreciation allowed in First year as per Income Tax Rules

FILLING MACHINES



Indra is a reputed manufacturing company in the Packaging segment. Indra's machines are engineered to meet stringent international weight-variation standard, incorporating highly sophisticated state-of-the-art technology. Machines are manufactured using sophisticated tools like CAD-CAM.

Indra has been manufacturing a wide range of custom-built special Purpose Machines for a wide variety of industries. The machines are engineered to suit different products, packaging materials at specified weight varation standards and economy. Indra undertake design manufacture and supply of complete Packaging lines and transfer lines as per customer's specific requirement. The company also offers 'Contract Packaging' facility in order to offer best of the services.

Its product line up includes Form-Fill-Seal machine Volumetric Cup Filler, Weightmatic Granule Filler, Weighmatic Oil Filling machine, Continuous Sealer and various types of Packaging Machines.

The machines are suitable for product like Tea, Milk, Syrups, Farsans, Potato Chips, Noodles etc. from 1gm to 25 kg in Sachets, tins, LDPE, PP Bags etc. The technologies used are volumetric Syringe oriented, Augur filler and State-of-the-art microprocessor operated loadcell based weigh filler. The machines are fully automatic, semi automatic and manually operated.

For more information, contact:

Indra
Shop No.2, Babu Chawl
Opp. Triveni Nagar
Kurar Village
Malad (E)
Mumbai 400 097
Tel: 8432281
Fax: 8892489
Email: raghuvanshi@vsnl.com

SPIRAL FREEZERS

One way to increase a product's shelf-life is to freeze it. Heat and Control have been in the business of developing and building Spiral Freezers since the 1960's. The first Heat and Control (Greer) Spiral Freezer was installed in 1968 and is still operating today.

The Spiral's conveying system allows the belt and stationery supporting bed to be arranged in either ascending or descending spiral path. The drum (in the centre of the system) imparts a continuous drive input to the belt to produce a low tension level. This feature means numerous tiers can be driven on the one drum, saving food manufacturers space whilst enjoying higher production throughputs.

Our experience over decades of building Spiral Freezers has allowed Heat and Control to develop a portfolio of different air flow patterns, air velocities and temperature suitable for various products.

Every Heat and Control Spiral Freezers is custom built to produce the highest quality product with the greatest product yield. Each product application will be analysed to ensure the best air pattern's is selected for performance, efficiency and cost effectiveness.

Out total systems approach to in-line freezing has been implements in the interests of assisting out customers to improve product quality and increase their business. Heat and Control has decades of experience in freezing and will provide your company with the food technology, engineering and service experience that you require to ensure your freezing system delivers and exceeds you demands.

For more information, contact:

Heat & Control Pty Ltd.
3, Anuraag, G-13
1st Main Road
Annanagar East
Chennai 600 012
Tel: +91 44 6631455/6633814
Fax: +91 44 6631466
Email: sugunt@heatandcontrol-india.com
heatandcontrol@vsnl.com
Website: www.heatandcontrol.com

FOOD TESTING CENTRE

Arbro Pharmaceuticals Ltd., a drug manufacturing and testing centre, to meet the demand and quality expectations of Food & Agriculture Industry has started its activities by providing testing and analytical services in the field of Food and Agriculture.

Arbro's Food Testing Centre offers complete chemical and microbiological testing services in the fields of Processed Fruits and Vegetables, Dairy Products, Cereals & Pulses, Edible Oils & Fats, Spices, Health Drinks, Beverages, Sugar and Confectionery, Packaged Drinking Water/Mineral Water etc.The Arbro's group of Laboratories are ISO-9002 certified by DNV and R&D recognised by Department of Science & Technology, New Delhi.

For further details, contact:

Arbro Pharmaceuticals Limited
(Food Testing Centre)
6/14, Kirti Nagar Industrial Area
New Delhi 110 015
Tel: 5467228/5457922,5457923
Fax: 5463784

SOYA NUGGETS PLANT

M.Son introduces to you a complete soya nugget manufacturing plant developed from over a decade of experience in the manufacture and application of food extrusion systems.

It's single head extruder is designed keeping in view the Indian manufacturing conditions.

The machine made to produce 80-100 kg of soya nugget in a hour. The meticulous design of machine ensures a very fine quality with no size variation. The package includes a mixer machine which is made in S.S. & mixes 80 kg soya grit in just 10 minutes.

For further details, contact:

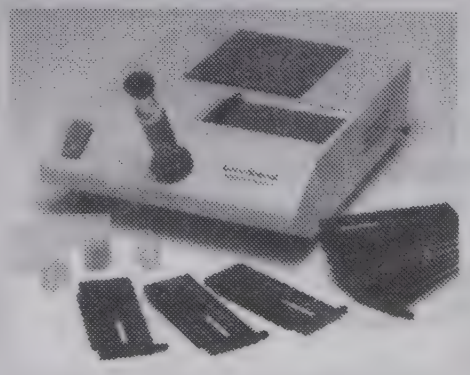
M.Son Industries
D-33, Sector-2
Noida (U.P.)
Tel: 89-52177

When Replying to Ads , Please Mention
BEVERAGE & FOOD WORLD

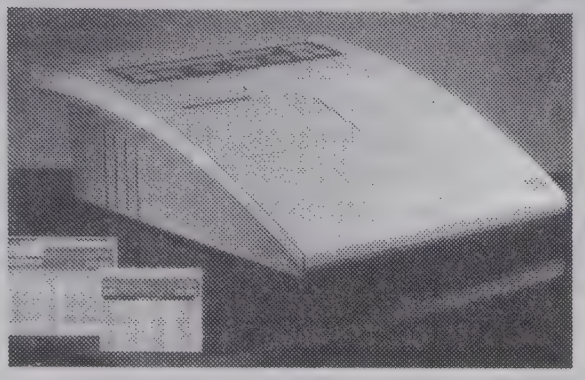
Lovibond® Tintometer

The Lovibond colour scale is based on accurately calibrated series of coloured glass filters in each of the colours red, yellow and blue, going from very pale to dark. Using various combinations of these glassess, it is possible to match the colour of almost any sample and then to express this colour in terms of Lovibond Internationaly recognised units. The Lovibond colour scale is widely used for products which transmit light such as oils, liquid chemicals and syrup; it is also used for some light-reflecting products such as fats and pastes.

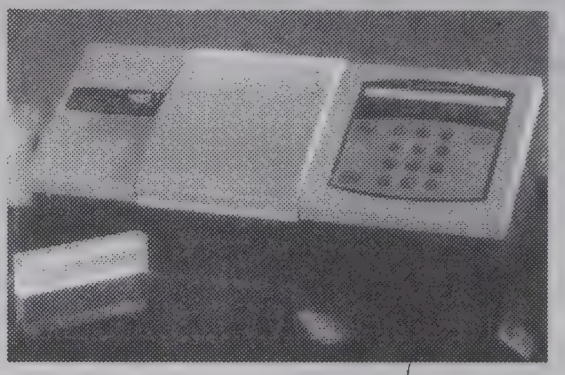
Also available from Lovibond Water Analysis, Photometers, Colourdiscs, Minikitts, Checkits.



Lovibond Tintometer
Model F



Lovibond PFX 190
Electronic Tintometer

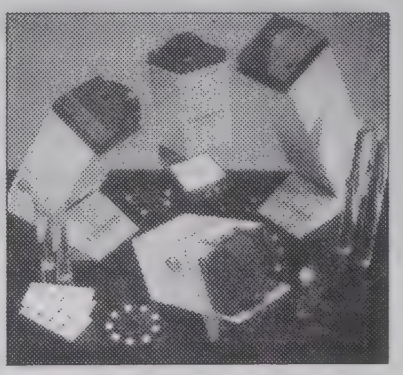


Lovibond PFX 995 / 880
Automatic Tintometer

Colour Analysis, Manual, Electronic, Automatic

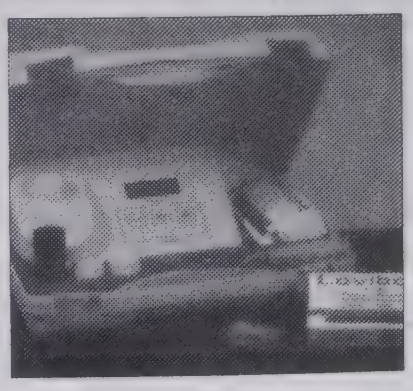
2000 Comparator
System

Colour Discs for
Colour & Water Analysis

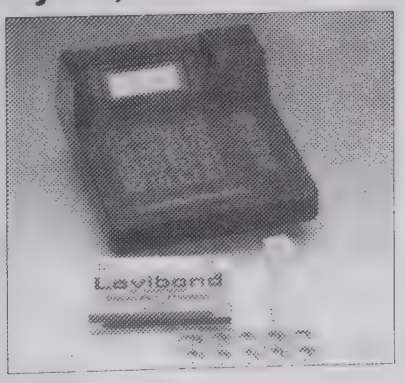


Nessleriser

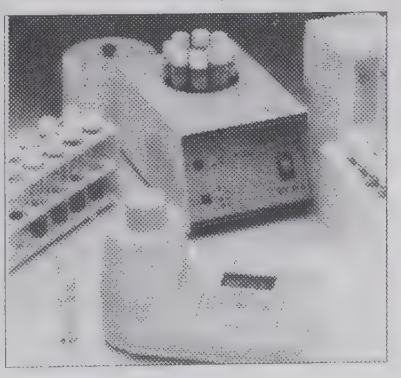
Water Analysis, Colour Discs, Photmeters, Minikts, Checkits



Turbidity Meter



Water Analysis
PC-22 Photometer



COD Measurment

BOD Measurment

Sunjay Technologies Pvt. Ltd.
A-32, Wadala Sri Ram Ind. Estate,
13, G. D. Ambekar Road, Wadala,
Mumbai - 400 031

Email : info@sunjaytechnologies.com
Home Page : www.sunjaytechnologies.com
Tel. : (022) 411 1497
Fax : (022) 411 1540

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MITHAI MANUFACTURING MACHINES

Indian traditional sweets known as mithai are mainly milk based and non milk based.

Over a period of last fourteen years Malhar Industrial Associates designed developed and made successful working plants for small and large scale manufacturing units of mithai like Mawa, Khoa based Burfi, Pendha, Dry Fruits based Kaju/ Badam, Burfi/Katali and other sweets like Basundi, Shrikhand, Rossgulla, Gulab Jamun.

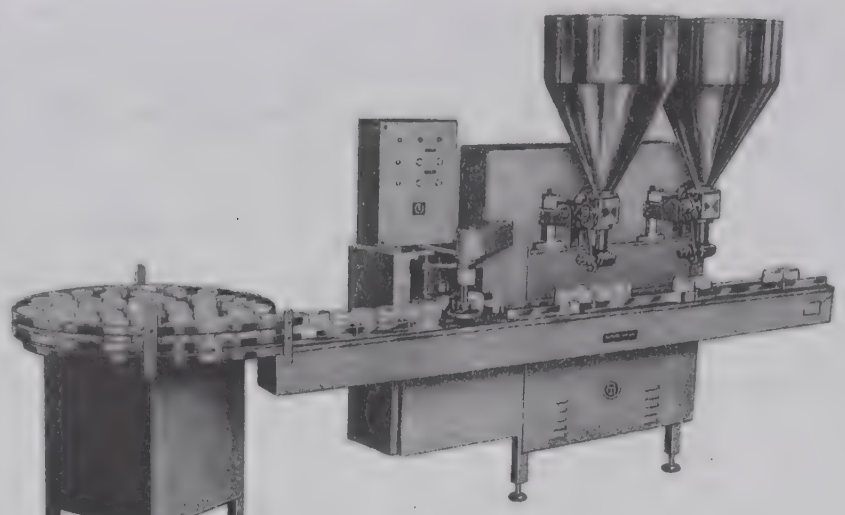
Other non Milk based sweets like Mohan Thai, Soan Papdi, Petha, Bundi Ladoo etc. are now being manufactured using stainless steel process equipments like Mawa machine, Kaju Katali, Rossgulla pans which are operated by Steam Generators are using LDO/Diesel as fuel and operates on 3 phase electric power. The conservation of energy and process engineering helps to reduce fuel cost by 50% and pays for itself within a short period of 8 to 10 months. Being energy saving devices such plants qualify for 100% depreciation during first year of use. All over India such plants are operative and they are backed by prompt low cost after sales services.

The modern plants and processes for manufacturing Indian Sweets ensure consistent quality, hygienic working conditions, traditional taste and rheological properties.

For further details, contact:

Malhar Industrial Associates
Regd. Off: B-3, Harish Ind. Compound
Royal Collage Road, Penkar Pada
Mira Road (East)
Dist. Thane 401 104
Tel: 6902332 • Fax: 8100348
Email: malharsweets@vsnl.net.

CREAM FILLING MACHINE



Autopack manufactures Automatic Twin Head Cream Filling Machine, Model CF-70 for accurate filling of products of various viscosities in Jars, Containers and Bottles of different shapes and sizes, with an accuracy upto +1%. Filling capacity ranges from 5gms to 1kg and output upto 60 fills/minute. The machine has a positive cut-off valve for drip free filling. The quantity of fill can be easily adjusted. Power input is 2KW. The machine can be linked with Automatic Machines like Sealing, Capping etc. The machine is suitable for filling creams, adhesive, balms, gums and food, pharmaceutical or cosmetic products in cream form.

For further details, contact:

Autopack Machines Pvt. Ltd.
101-C, Poonam Chambers,
Dr. Annie Besant Road
Worli, Mumbai 400 018.
Tel: 497 4800, 492 4806
Fax: (22) 4964926
Email: autopac@bom3.vsnl.net

INDIAN SNACK & NAMKEENS PLANTS

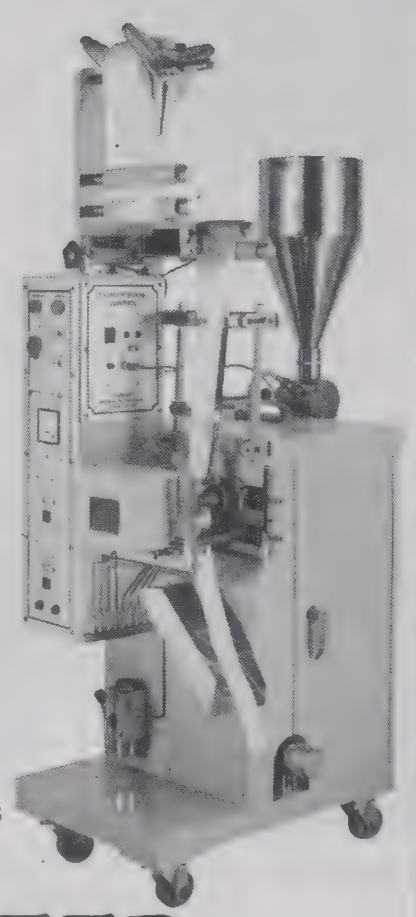
Since ages, Indian Snacks, Namkeens and Farsan are being made by traditional methods using open fire & cauldron (Kadhai), manually, using human judgement, to control temperature, quality of frying oil and batch size. Now a team of engineers and technicians at Sadanand Approtech Pvt. Ltd. have developed modern manufacturing Plant and Machinery, which offers Indian Snacks & Namkeens of traditional taste, appearance and feel, 50% fuel saving and 100% depreciation, being '**Energy saving devices**'. Due to controlled heating and modern methods of manufacturing, excellent hygienic conditions leading to 5 to 7% savings on frying medium. The manufacturing plants are time tested, proven products and are offered with performance guarantee.

Direct users, Food Technologists, Scientists and Projects Consultants are invited to make use of these products to benefit from Engineering and technological development.

For further quarries, contact:

Sadanand Approtech Pvt. Ltd.
D-34, Mini Nagar
S.N. Dube Road
Dahisar (East), Mumbai 400 068
Tel: 8114536/8104143
Fax: 91-22-8100348
Email: sadanandfoodmachine@rediffmail.com

A Fully Automatic
Vertical Form-Fill Seal
Machine for Producing
Sachet/Pouches from
Heat Sealable Laminate



Application :
For Packing various Liquid & Paste such as Shampoo, Cream, Soyasouce, Butter, Mayonaise, Jam, Seasoning solution, Detergent paste etc. Machines also available for packing granules/ Powders & Oil.

GURDEEP
PACKAGING MACHINES

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TEL. : 578 3521, 577 2846 FAX : 91-22-577 2846
E-MAIL : gurdeep_packaging@hotmail.com

BUYERS' GUIDE

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Products: White Boards * Pin Boards * Felt Boards * Chalk Boards * Display Boards * Flip Charts Board Stands

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AQUA FILSEP INC, 7, Retiwala Industrial Estate, H.A. Palav Marg, Byculla (E), Mumbai- 400027. Tel. (O): 3719455 (R): 4465521, Fax: 91-22-4465521. Ahmedabad: A1/ 1, Chinubhai Towers, Above IOB, Opp. Handloom House, Ashram Road, Ahmedabad 380009. Telefax: 079-6580047/6584069, Email: filsep@ad1.vsnl.net.in, Website: www. aquafilsep.com
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AUTOPACK MACHINES PVT. LTD, 101-C, Poonam Chambers, A-Wing, Dr. A.B. Road, Worli, Mumbai 400014. Tel: 4974800/ 4934406/4924806, 4910593, Fax: 4964926, Email: autopack@bom3.vsnl.net.in, Website: http://www.autopack machines.com
Products: * Powder Filling Machine * Cream Filling Machine * Capping Machine * Horizontal Pillow Pack Machine * Carton Overwrapping Machines * Liquid Filler Machine *Band Sealer Coding Machine *Coliating Machine etc.

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Products: * Food Processing Machinery such as * Pulpers * Juice Extractors * Steam Jacketed Kettles * Fruit Slicers/Crushers *Mango Cutter * Canning Retorts, Hot/Cold Liquid Filling Lines * Bottle Closing Powder Filling, Form-Fill-Sealing Machines * Dryers (Tray, Tunnel, Drum, Fluid Bed) * Biscuit/ Bread Making Machinery * Toffee-Hard Boiled Sweet Machinery * Chewing Gum Making Machinery * Ovens * Sigma Kneaders * Mixers

BRITOMATICS ENGINEERS PVT. LTD., C-9, NandDham Ind. Est., Marol Maroshi Road, Andheri (E), Mumbai 400059. Tel: 91-22-8500833/8505834, Fax: 8504999 / 8505334, Email: britomatics@india.com, Website: www.britomatics.com/www.digicatonline.com/britomatics
Products: * Filter Cartriges & Filter Housings for F& B, Pharmaceutical Industry & Biotechnology

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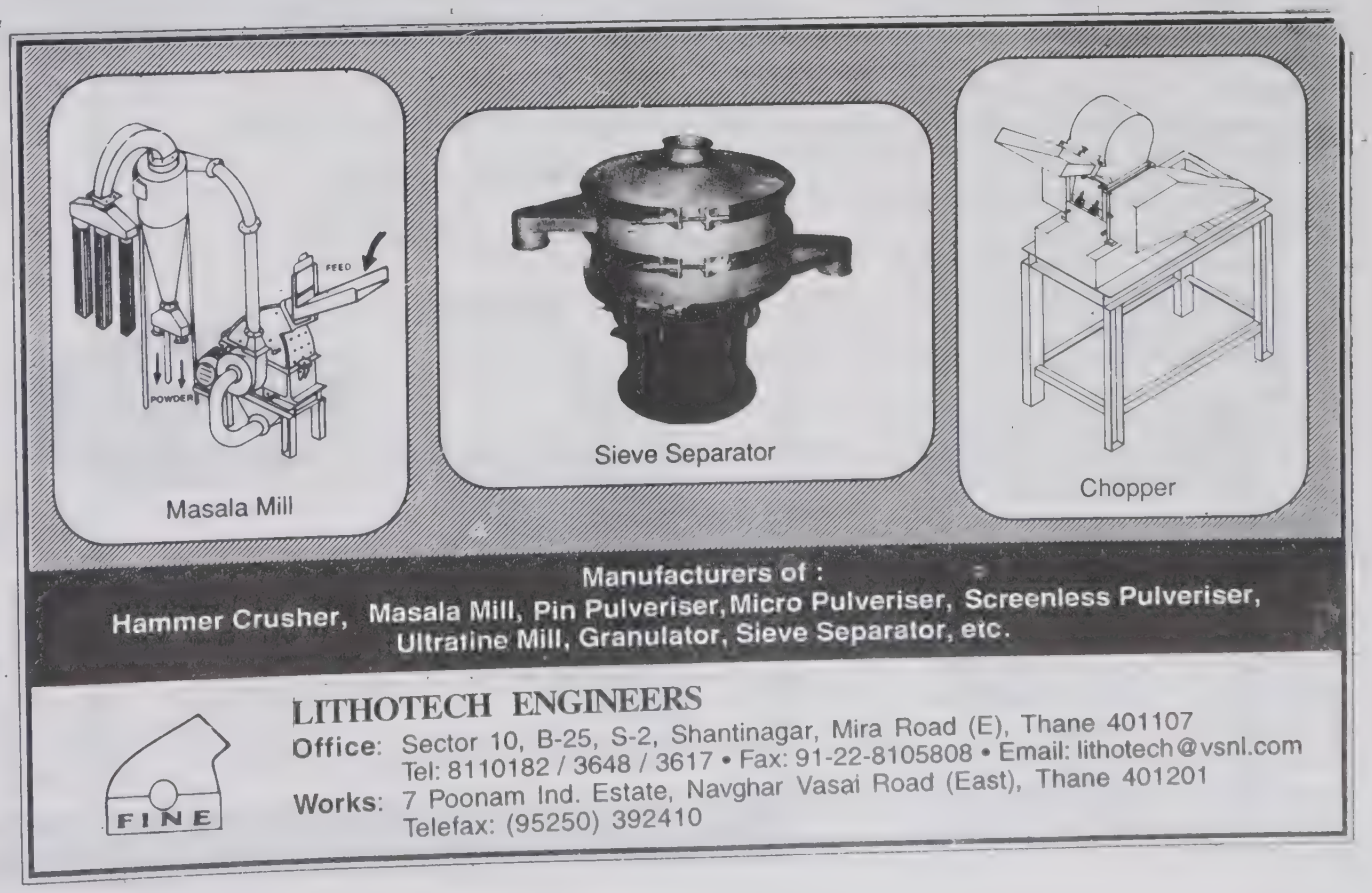
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GURDEEP PACKAGING MACHINES, Harichand Mill Compound, L.B.S. Marg, Vikhroli, Mumbai 400 079. Tel: 5783521, 5772846, Fax: 91-22-5772846 Email: gurdeep_packaging@hotmail.com
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GURU NANAK ENGINEERING, D-107, Sector 7, Noida 201301, District, G.B. Nagar, U.P. Tel: 011-8-454 2530, 451 9360, Fax: 011-8-453 5160, Email: meera@nd3.vsnl.net.in
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H.P. INDUSTRIES, 2, Joaquim Cottage, Vazir Glass Works Road, J.B. Nagar, Opp.Tata Infotech Ltd., Andheri (E), Mumbai 400059. Tele/Fax: 8352505, 8392883, Email: hujone@bol.net.in, Website: www.hpmachines.com
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K. RAHEJA MERCANTILE CORPORATION., 108, New India Indl. Estate, Off Mahakali Caves Road, Andheri (E), Mumbai 400093. Tel: 8382032/1529/8394665/4666, Fax: 8363458, Email: sales@krahejacontainers.com, Website: http://www.kraheja containers.com
Products: * Thin Walled Plastic Containers

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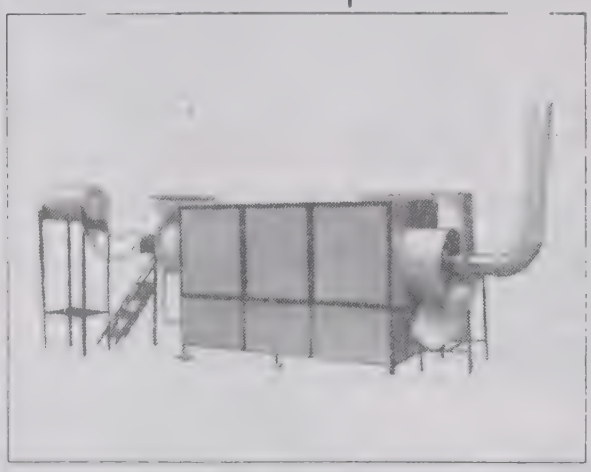

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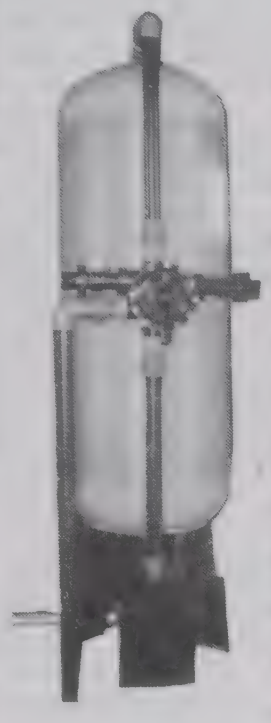

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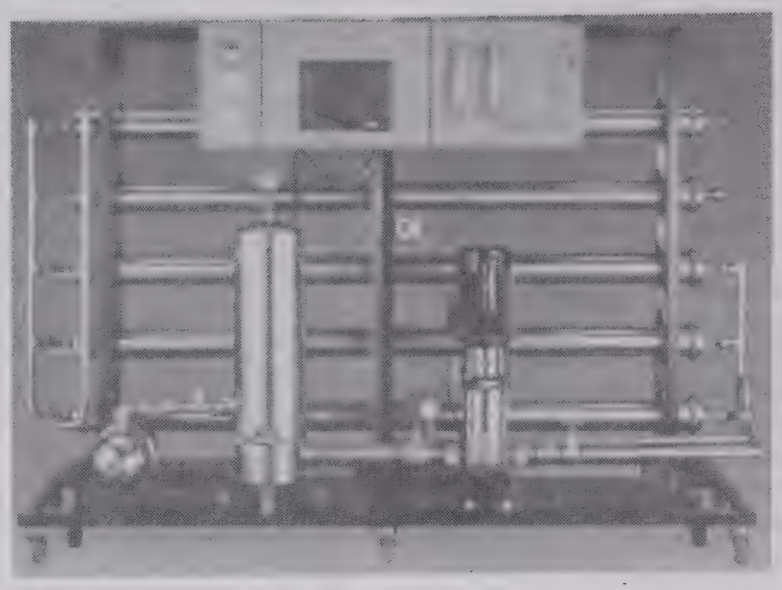

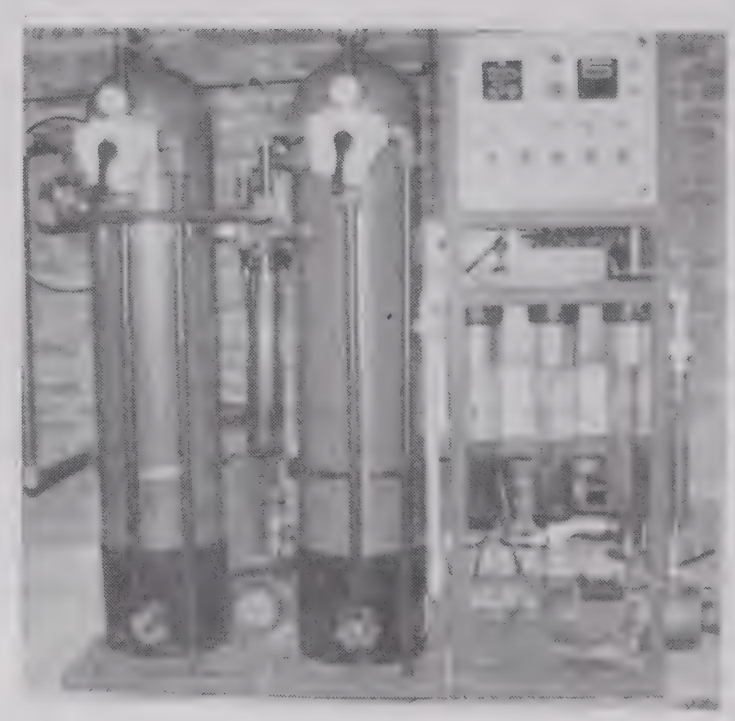

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COMPANY NEWS

UB GROUP

The UB Group is looking for a foreign joint venture partner who will market some of its brands abroad. In case of foreign player picking up a stake in UB Group, the company will incorporate a clause which makes it mandatory for the foreign company to market some of its popular brands, including its largest-selling Kingfisher brand abroad.

The UB Group is also looking for a strategic partner in Associated Breweries & Distillers (ABD).

The induction of a partner in ABD, as ABD's association with the UB group having strong brands, huge manufacturing and distribution network, it may be possible to get a "high valuation for ABD's beer business. Through the ABD acquisition, the UB group has added to its portfolio well known brands such as London Pilsner, London Diet, Maharaja, Premium, London 2001 Plus, London 5001 Plus and San Miguel."

UB Ltd will soon launch a low alcohol variant of its flagship brand, Kingfisher for those who don't want to get tipsy, but still want to have a mug of beer or for those who don't want to add to their bulging girth.

Expected to be named Kingfisher Sport, the brand will have a mere 3.5 per cent alcohol content compared with over 4.5 per cent in rest of the variants.

Vishwanathan said the low alcohol content beers brands are extremely popular in the west, With this launch, UB Ltd. will have a beer variant in most categories.

SOUTH AFRICAN BREWERIES

South African Brewery recently acquired the Mysore Breweries and is now aiming to acquire GMR Varavi Brewery in Hyderabad. It is of immense importance to SAB to tie up with a regional player for breweries in Andhra Pradesh as the state is the second largest beer market in India selling 12m cases. This means the retail trade would be around Rs. 750 crore. Andhra Pradesh is emerging as a key market since the production is less and demand is high. The beer market in the state is currently dominated by players like United Breweries, Shaw Wallace and Mohan Meakins.

Till the licence comes through, if SAB acquires the brewery right away, it will be the first global multinational to establish itself in the state way ahead of others. The other multinational, which is believed to be keen on having a brewery in the state is Foster's.

Another opportunity may emerge for SAB in view of United Breweries' interest in considering an open offer from the foreign multinational. SAB cannot remain a serious player without expanding its network. Hence, the obvious move now is having many more breweries in its fold. Through the acquisition of Narang Brewery in 2000 and MBL recently, it has now about four breweries.

MOVENPICK

Swiss food and restaurant product major Movenpick Foods is now all set to enhance its presence in the Indian super-premium ice cream market with a chain of upmarket branded Swiss Cafi and ice cream boutiques and parlours. These boutiques, with a "classy five-star ambiance," will serve an array of Swiss premium ice creams, speciality coffees, assorted savories and desserts.

Ice cream kiosks equipped with softy machines across the north are also on the anvil.

HIGHLAND DISTILLERS

Highland Distillers from Scotland are eagerly looking for an Indian Company to market its products in India. Highland Distillers, at present, has a liaison office in the country and its brands are available only through duty free shops, hotels and leading restaurants. However, once the liquor policy is relaxed further, the company plans to make its brands available nationally.

However, though the company has other products in its international portfolio such as rum, champagne, etc, its core focus in India will be on whiskey. According to Mr. Dinesh Jain, Managing Director, India and area countries. 'The Famous Grouse' scotch whiskey is currently the largest growing Scotch in the duty free section and sales have been increasing rapidly. The company is also looking to introduce more brands from its international portfolio. This includes 'Macallan 1946', priced at $2000 (approximately Rs. 95,000), which will be available at the ITDC duty free shops. Other brands to be introduced include Macallan malt whiskey, Cointreau Liqueur, etc.

Highland Distillers, along with Remy Cointreau (of France), has a 25:25:50 joint venture with DCM Shriram Industries called DCM Remy Ltd.

TILLY SABCO/RIZ INTERNATIONAL

Soon the Indian market will be flooded with imported poultry products. It is now the French poultry giant Tilly-Sabco, a $100m company that is entering the Indian market. France based Tilly-Sabco ranks among the world leaders in production and export of poultry. Sabco is the first ever imported poultry brand to enter the Indian market since the government removed the quantity restriction within the framework of WTO agreement. Sabco has tied up with Indian company Riz International for marketing their products.

NESTLE INDIA

The Rs. 1,677 crore Nestle India is all set to launch its iced tea brand Nestea, in the Indian market.

Sources say that the company is likely to launch iced-tea in a ready-to-mix powder form. In the international market, however, the company has launched its iced tea in the form of a liquid concentrate. It has been launched in three flavours, lemon, raspberry and green tea with honey. The company claims that the three flavours are 100 per cent natural with no artificial colours, flavours, additives or preservatives.

Nestle is keen to launch beverages in India as this market is expected to boom. Sources say that the company will boost its efforts to tap this market with innovative products. It is understood that the ready-to-drink beverage sector is witnessing an exponential growth.

Nestle India has recently forayed into the small-sized, packaged coconut milk segment under the Maggi brand name. This is not all. The company is now focusing on the Maggi umbrella brand as their core thrust area and will be launching many more products shortly.

In addition to this, the company has recently tied up with Bangalore-based dairy major Nilgiri Dairy Farm and expects to tap the market in the south with milk, curd and other milk-based products. And to complete its products range, the company is planning to launch butter soon.

ZYDUS CADILA HEALTHCARE LTD.

Zydus Cadila Healthcare Ltd., is repositioning Sugar Free, a low-calorie sweetner, as a brand that represents a healthy lifestyle for all health conscious people as well as people suffering from diabetes. To this end, Sugar Free is now relaunched in a new, slim pack. Sugar Free is available in packsizes of 100 tablets and 300 tablets.

CADBURY INDIA

Chocolate major Cadbury India will be launching some of its global confectionery brands in India.

Cadbury India, a subsidiary of Cadbury Schweppes, currently has brands such as Dairy Milk, Five Star, Perk, Milk Treat, Eclairs and Gollum in its Indian portfolio.

The global collection includes confectionery products such as Flake, TimeOut, Wispa, Caramel, Fuse and Cherry Ripe.

In sugar confectionery, its brands are Bassett's Maynard, Pascall and Trebor. The products range from wine gums, fruit pastilles and liquorice of all sorts to sugar-free mints and bubble gum.

Other confectionery brands include Maynard Wine Gums, Bassett's Liquorice Allsorts, Trebor Extra Strong Mints, Trebor Mighty Mints (sugar-free mints) and Trebor Softmints.

In France, Cadbury Scheweppes is the market leader in chewing gum. In Argentina, the global major's brands include Beldent and Bazooka. It recently entered the Chinese gum market through the acquisition of Wuxi Leaf and Sportlife brands.

TETRA PAK INDIA

Igor Akimov the managing director of Tetra Pak India has blamed the high taxes and legislative issues for the restricted growth in the use of aseptic packaging of liquid food beverages and milk in India compared with other developing countries.

The high levels of wastage in fruits, vegetables and milk in the country was due to lack of processing and packaging facilities as high taxes and energy costs had prevented companies from investing in these packaging and filling machines. Import duty on aseptic filling machines in India is as high as 50 per cent.

Tetra Pak India's facility at Takwe, near Pune, has projected 70 per cent of its exports to China in the current year due to high demand there. In the last calendar year, Tetra Pak India exported 400 million aseptic packages to China, while only 550 million packages were consumed locally.

The poor local demand has resulted in the low capacity utilisation of Tetra Pak India's facility. Exports and local demand put together has seen under 50 per cent capacity utilisation of Tetra Pak India's 2.3 billion packages per annum capacity.

Currently these machines are produced by Tetra Pak only in Sweden and Italy. High energy costs in the country is another factor that has proved to be a stumbling block for the growth of the food processing and packaging industry.

TATA TEA

Tata Tea has phased out support for four brands — Brahmaputra, Lucky Cup, Leo and Chola - as part of its brand rationalisation as these brands had shrunk in terms of potential for growth as well as profitability.

The focus of the company will shift towards some existing brands, namely, Tata Tea, Kanan Devand and Agni, Kanan Devan also happened to be Tata Tea's first brand to be packed in polypacks, followed by Tata Tea Premium.

According to industry sources, Tata Tea enjoys a market share of 8 per cent, Agni of 4 per cent, Kanan Devan of 4 per cent and other brands from its stable 4-5 per cent. In the branded packet tea market Tata tea has a market share of 17-18 per cent.

Despite a sluggish tea market, Tata Tea has raised its price marginally in the northern and eastern regions after improving the quality.

The company is planning to launch a premium brand in the leaf category, which would be pitted directly against Taj Mahal from the Hindustan Lever Ltd. (HLL) stable.

Tata Tea will soon introduce Tetley brands in India. Tata Tea already has a joint venture with Tetley, Tata Tetley, in south India, which is an export oriented unit.

ZEPPELIN MOBILE SYSTEMS INDIA LTD.

Zeppelin Mobile Systems India Limited a subsidiary of Zeppelin Mobile System, GmbH, Germany has decided to launch, Refrigerated Vehicles, in India based on original German design for safe transportation of perishable goods. While designing, due care has been taken for unique Indian climatic and road conditions.

Peter Bauer, GmbH, which is now part of Zeppelin, Germany, a leading company in the field of body building, sub frame construction, Torsion Free Systems, low loading trailers etc., has provided Zeppelin India basic design inputs.

Zeppelin can offer insulated bodies in any size and for any vehicle in various combinations of metal skins and very shortly will have a big family of 'Kool Kargo' in India.

BACARDI MARTINI INDIA

Bacardi Martini India recently launched Bacardi Limon in India, and has now decided to concentrate on its three existing brands in the country. While Bacardi Carta Blanca, Bacardi Reserve and Bacardi Limon are its existing brands in the country, the other products yet to be introduced in India include Bacardi Gold, Bombay Saffir Gin and Dewars White Label.

AMUL PIZZA

Far away from the pizza hubs of the metros, in remote Surat, Amul has just opened 10 pizza parlours in Gujarat. What is now called a pilot project is expected to become a full-fledged business in six months. Amul is currently test-marketing a basic capsicum, onion, tomato pizza at just Rs. 20, which could well change the contours of pizza consumption in the country.

According to Mr. B.M. Vyas, Amul's managing director the response to the pilot project has been pretty good. Each parlour is selling over 100 pizzas a day. Even in remote areas of Mehsana and Palanpur in Gujarat - where pizza are virtually unknown- the parlours are selling 50 pizza every day.

Amul has adopted this radical strategy to expand the consumption of mozzarella cheese, a core ingredient which goes into the making of pizzas. The entire project is based on the franchisee model. Amul will hire pizza consultants who in turn will train the franchisees.

Amul also plans to launch frozen pizza in the snack market. The cooperative is yet to fix the launch date and the price details but sources indicate

that it will be available soon, at reasonable prices.

FRICK INDIA LTD.

Frick India Ltd. was incorporated as a public limited company in 1962 in collaboration with Frick Company USA, one of the world's oldest and largest manufacturers of industrial refrigeration and air-conditioner equipment.

Frick India has the unmatched advantage of providing a single-source responsibility for turnkey industrial refrigeration and air-conditioning systems covering design, manufacture, packaging, installation as well as custombuilt to meet customer's specific requirements.

The company offers a wide range of products like automatic screw compressor packages, liquid ammonia pumps, flake ice maker, pre-cooling rooms, freezing equipment such as plate freezers and blast freezers, evaporative condensors etc. It also manufactures product coolers for almost all applications. It can offer systems that have controlled atmosphere and are fully automatic. Frick India can also provide on line Total Energy Management Systems (TEMPS) keeping in tune with global standards.

GRANT AND SONS/BACARDI MARTINI INDIA

Manufactured by Grant and Sons 'Glenfiddich' world's leading single malt whiskey is now launched in India.

The company, Grant and Sons, already has a presence in premium hotels and top end bars. The firm has tied up with Bacardi Martini India to market its single malts. The company is planning to bring in only the Glenfiddich 12, 15 and 18 year old whiskey.

International brand ambassador Jens Tholstrup said "The Glenfiddich single malt is made from barley malt, spring water, yeast and peat. The difference between Glenfiddich and others, is that this is the only single malt that is not only distilled, but also matured and bottled at its own distillery in the Highlands." Most other distilleries in the Highlands send their single malts to their breweries located elsewhere to mature and bottle. "So the quality of spring water used is different from the Highland spring water," he says. Also Glenfiddich uses very little peat to give mildly smoky flavour, whereas other single malts have a more smoky aroma.

CAMPARI INTERNATIONAL

The latest entrant to the flooded Indian Vodka market is Campari International, manufacturers of Campari. The company introduces "Skyy Vodka" in the price range of Rs 1,000 for a 750 ml bottle. Campari International, plans to sell between 60,000 to 100,000 bottles in its first year in the Indian market.

The company was encouraged to introduce Skyy in the Indian market by the high rate of growth of the vodka market, which is in the region of 35-40 percent a year.

The company which has already introduced Cinzano Vermouth in the Indian market, will relaunch the brand in a renewed package, very soon. For this, the company, has already made an arrangement with the Indage Group of Companies.

Besides, the Campari group will soon import its sparkling wine range which include Cinzano Asti, Gran Cinzano, Cinzano Pinot Chardonnay, Cinzano Riserva and Cinzano Tiziano.

MOTHER DAIRY

Mother Dairy is firming up plans to get into the business of selling both bread and butter. It seems bread is not so much of a threat in the market as compared to butter.

Amul and Mother Dairy had mutually decided not to operate in the same market on account of being the offshoot of the same parent NDDB but Amul officials say that the equation might change now.

The butter market has been rather stagnant for the last few years at 50,000 tonnes every year. So far, the Amul brand of Gujarat Cooperative Milk Marketing Federation (GCMMF) was the undisputed leader till Britannia came with its Milkman brand butter. Amul is still the king and it will take a while before Britannia catches up with Amul nationally.

Sources said that Amul and Mother Dairy's presence in this segment will however keep prices of butter in check. Mother Dairy is currently readying the Pilkuah plant to churn out butter in the next few months. As regards bread, it has already started test marketing Perfect and Harvest Gold to gauge the demand on a daily basis. Sources say a third party manufacturer will knead the dough for Mother Dairy bread. Mother Dairy is also in race for leadership in Delhi's Ice Cream Market with Hindustan Lever Limited.

DHAMPUR INVERTOS LTD

Dhampur Invertos Ltd., will launch Jaggery Classic under its Speciality Foods Division. It is the good old 'gur' now available in attractive packages which will be hygienic and chemically free. The company has recently launched 'Sweet-n-Sweet' liquid sugar. Besides, jaggery and liquid sugar, the

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company has other products in its portfolio including Brown sugar (raw unbleached natural sugar), Icing sugar, Castor sugar, Golden syrup.

Today, speciality sugar or derivative sugar is a very small category in India. However, it is a category which is small but offers high margins compared to normal sugar where margins are minimal.

TATA COFFEE / BARISTA COFFEE COMPANY

Tata Coffee and Barista have joined hands to create Asia's largest consolidated coffee player. Tata Coffee, Asia's leading coffee company, has picked up 32.5 per cent equity in Barista Coffee Company, India's largest and fastest growing coffee retailer which is valued at Rs. 100 crore.

The alliance gives the Tatas access to the front-end market through Barista's rapidly expanding consumer base, while Barista gets an access to the Tata's roasteries and plantations, as well as a large play in domestic and international markets.

The sheer size and integration of the alliance now makes Starbucks entry to India very difficult. Tata Coffee is also entering into retaility pepper.

MADHAV FOODS

Madhav Foods (known more by its brand name Pasand), having a modern plant near Baroda, has been awarded both HACCP & ISO 9002 certificates by Australia's leading certifying agency Quality Assurance Services (QAS). ISO 9002 standard ensures that a highly professional quality management system controls all manufacturing operations. HACCP is recognized as the most effective system for food safety and hygiene, by bothWHO (World Health Organization) and US FDA. HACCP enables manufacturers to identify and control hazards at the earliest stage in production. Thus, a certified HACCP system generates confidence that the food produced will be safe to eat. Additionally, the company also has the KOSHER certificate.

Perhaps Madhav Foods is the first pickle factory in India to receive these prestigious certificates. These certifications will provide assurance of safety and quality to their customers. This in turn will boost the sales of more than 200 varieties of pickles manufactured by Madhav Foods. Their detailed documented procedures direct and control every manufacturing activity from hygiene, sanitation and selection of raw materials to processing and packing. It is not surprising therefore, that Madhav Foods' products like pickles, chutneys, curry pastes and sauces are popular in the markets of USA, Canada, Australia, & Europe.

Situated in the green belt of Padra, the company is planning for a collaboration to market their natural syrups, curry sauces & oil free snacks. It has also developed dehydrated pickles and low sodium & oil free pickles. Madhav foods now plans to launch their products in Maharashtra, Rajasthan & Delhi.

Mr. Chandresh Shah, the proprietor of the company is a qualified food technologist from UK with 30 years experience in this field, and is committed to making Madhav Foods a benchmark for quality and safety in food processing.

Mr. Vijay Shah, who looks after the overseas operations, feels that HACCP & ISO 9002 will be a great boost in the export market. Developed overseas markets need assurance of both safety and quality before they would trust any food products. This HACCP & ISO 9002 certification will therefore help in obtaining a better entry into super markets.

The company is also planning to start a training center for HACCP implementation in food processing industries in Gujarat.

AGROTECH INDIA

AgroTech India, the Indian Arm of the worlds biggest popcorn company and US Food major, Conagra, is now on an expansion mission of its core brand 'Act II'. The company hopes to have at least 100 theatres selling its popcorn brand in India in a year. The butter and the tomato flavours are two new flavours for the cinema halls while the retail market will have chilli flavour.

Cinema sales alone are expected to reach 1,000t per annum, swelling the popcorn turnover to Rs. 25 crore.

For an out-of-theatre popcorn experience, the company is looking for franchisees, who will operate 25-30 retail locations in their city. Retail packs of the brand are already available in grocery stores. For Conagra, India is a huge market for popcorn, which it cannot afford to ignore.

COCA COLA ENTERPRISES INC.

Atlanta-based Coca-Cola Enterprises Inc., plans to buy Herb Coca-Cola the world's largest bottler of Coca-Cola, the third largest bottler of Coca-Cola drinks in the US. The deal valued at about $1.4 billion, including debt, also includes the take over of Hondo and Herbco Enterprises Inc.

In the past year, Coca-Cola Enterprises has been hit by an economic downturn in key markets, increased competition in North America from Coke's arch rival PepsiCo. The company operates in parts of 6 states with revenue of about $913 million with sales of about 200 million unit cases.

BRITANNIA

Britannia Industries Ltd, the bakery and dairy products maker intends to buy out companies in the same lines of business with proper brands and manufacturing facilities in order to expand.

The company acquired the brands and 49 per cent equity of Kwality Biscuits Ltd. recently for Rs. 30 crore.

Britannia will seek to strengthen and reposition its brands to become the leading producer. In the dairy and cheese segment, the company has already established itself as a major player with innovative packages and products despite strong competition.

DAAWAT

Daawat a premium brand of Basmati rice, marketed by L.T. Overseas will now be available and packaged ready to cook rice.

The company is now working on eight seasonings with flavours to match popular Indian tastes such as ginger-garlic, lemon, tomato and masala.

The seasoning will be packaged separately in pouches and these will be sold along with the plain basmati rice.

These are value added rice-based products and will be reasonably priced. A few flavours were already being test-marketed in the south.

Daawat is sold in 11 variants in addition to the brands Heritage and Sona Chandi.

The company is also working on the concept of ready-to-cook rice, on the lines of tea bags. Daawat has a 17 per cent share in the Rs. 400 crore branded rice market.

PATNA DAIRY TO LAUNCH SUGAR-FREE ICE CREAM

Patna Dairy Project has launched ice cream without sugar under the brand name 'Sudha Sugar Free Ice Cream'. The ice cream, introduced in two flavours of strawberry and vanilla, will have all the sweetness of normal ice cream. A 50 gm pack has about 55 calories less than a normal ice cream, which has 138 calories.

Company will introduce *lassi* and flavoured milk in tetra packs, which would increase the life of these products

up to six months period and it would also be sent to the markets outside the State.

H.J. HEINZ

H.J. Heinz, one of the top food producers in the world, unveiled the latest gimmick designed to keep kids amused at the dinner table – purple ketchup.

Heinz EZ Squirt Funky Purple will begin appearing on grocery shelves soon. The World's No. 1 Ketchup maker's latest move follows the launch of a Blastin' Green version of the popular condiment nearly a year ago. More than 10m bottles of the green ketchup were sold in the first seven months, Heinz said.

"The tremendous success of Heinz EZ Squirt Blastin' Green showed us that kids love decorating their food with colors that are bright, wild, even a little... funky," said Casey Keller, head of Heinz's condiments business. Children are the largest users of ketchup, consuming about 5bn ounces a year, or more than half that used in the United States, said an official of Pittsburgh-based Heinz, the company that has more than 5,700 food product brands.

HINDUSTAN LEVER LIMITED

Fast-moving consumer goods major Hindustan Lever Ltd. (HLL) has recently acquired the Modern Foods Industries Ltd. and plans to launch biscuits through it.

HLL was also looking at acquiring a couple of companies or brands to grow its biscuits business. The company is also studying the viability of Modern's beverage brand "Rasika" near New Delhi, but the chances of reviving the brand are slim as HLL plans to make bread and biscuits as its core business at Modern Foods.

It also plans to centralise wheat procurement and make Modern Foods an integrated wheat products business across the country. Modern's bread sales in the fiscal 2000-01, the first year under the HLL, management, increased to Rs. 102 crore compared with Rs 78 crore in fiscal 1999-2000. Growth in the brand sales in the first four months of 2001 was 80 per cent.

HLL has invested Rs. 3.5 crore in modernisation and buying of new equipment and will continue to make further necessary investments.

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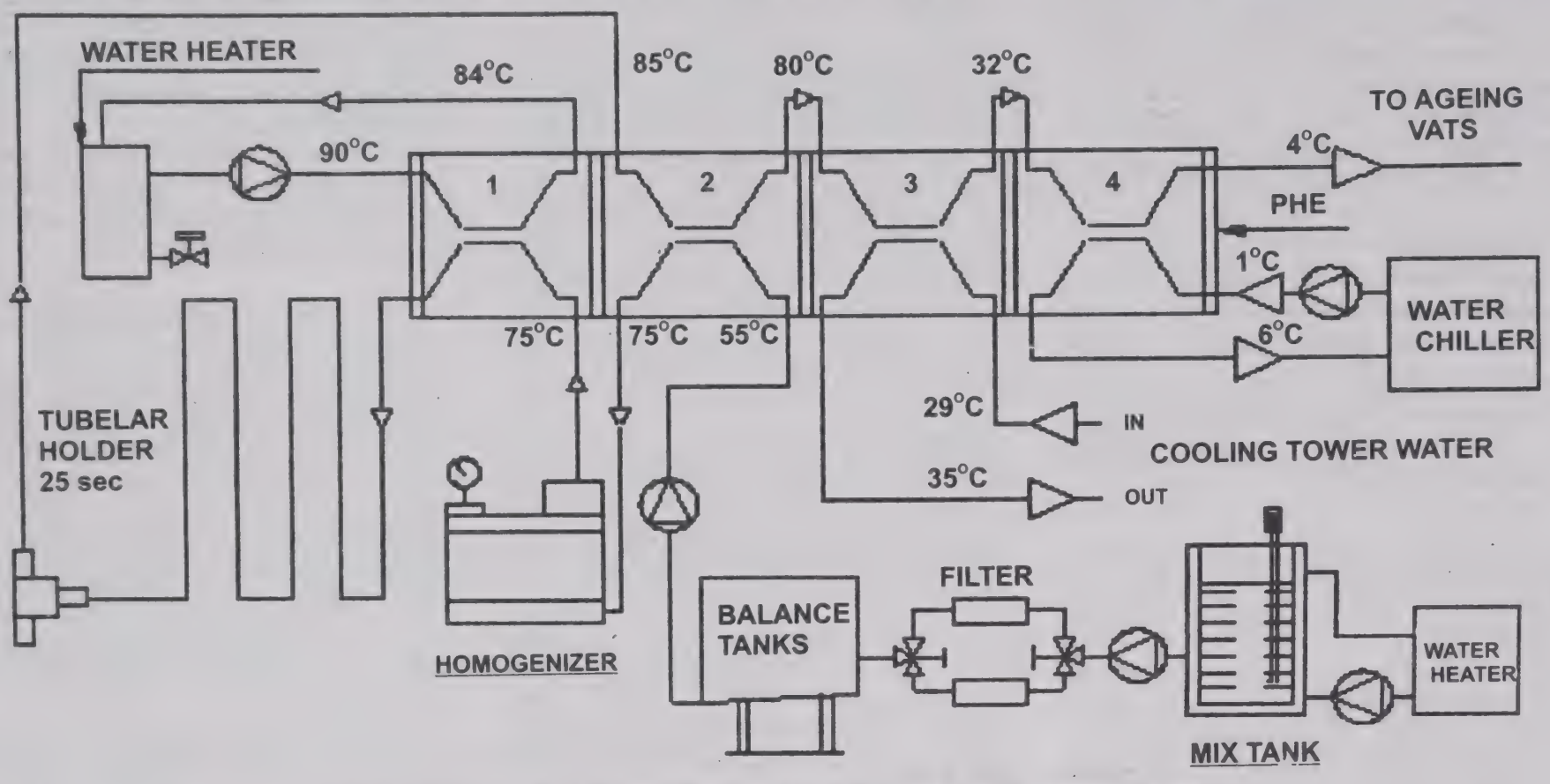

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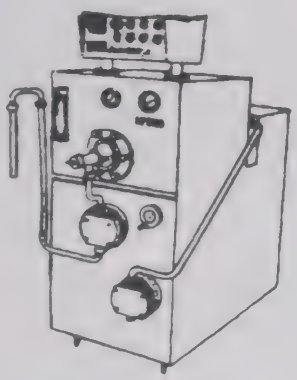

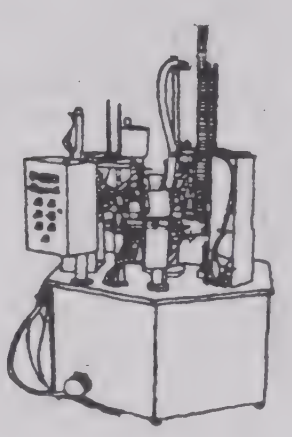

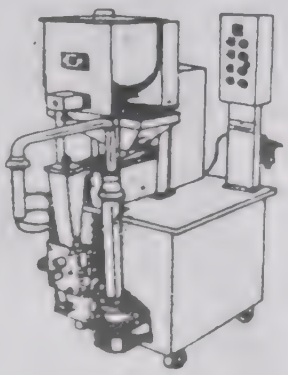

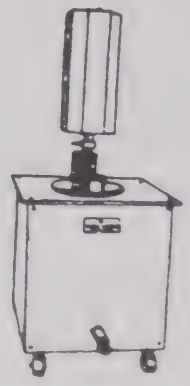

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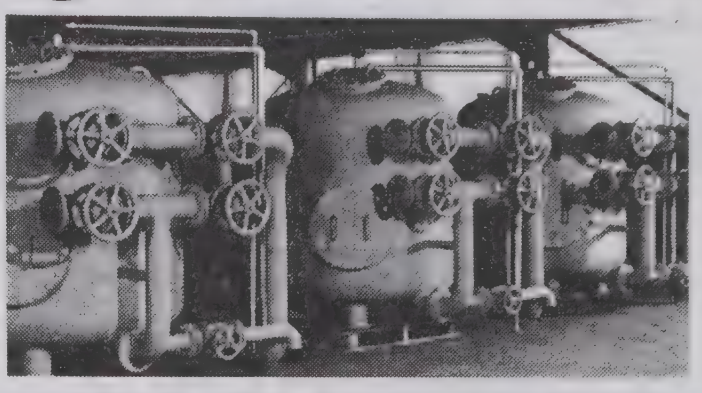

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INDIAN NEWS & NOTES

THE BITTER TRUTH ABOUT SUGAR EXPORTS

Indian sugar exports are now free but the outflow has yet to become significant. The industry blames the always-too-low world prices for their inability to sell.

According to the world bank study on liberalisation trends in global commodity markets, the price of protectionist policies followed by the biggest producers, including India, is paid by the international market as a whole through volatility and significantly lower prices. In fact, virtually all countries intervene in domestic sugar markets, and only the smaller share of these countries keeps their individual interventions from affecting global markets.

Developing countries like India usually intervene to become self-sufficient and keep consumer, prices low. The EU and USA, on the other hand, use international markets to manage domestic sugar surpluses and shortfalls, as do other large sugar-consuming and producing nations. Colombia, Mexico, Poland and South Africa all subsidise sugar exports. The World Bank believes that in doing so, they pass their production and demand uncertainties on to the world market, making world prices more volatile than they would have under free trade.

UTTAR PRADESH OFFERS SUBSIDIES TO PROMOTE MANGO EXPORT

In a bid to promote the export of mangoes from Uttar Pradesh, the state government has drawn up an attractive policy with subsidies on the exportable amount and sops on air and cargo movement. The UP government is also working on modalities for easy credit facility from banks for the exporters.

Uttar Pradesh has had a bumper mango crop of around 42 lakh tonne in the current season. The state has earmarked 5 lakh tonne as exportable surplus for the season. Last year, UP had exported just 6 tonne of mangoes.

FISH IMPORTS TO COST MORE

The Government said that there has been no increase in the import of fish, but higher import duty could be imposed if the interests of fishermen are affected.

This was conveyed by the ministry of agriculture, department of animal husbandry and dairying, to a group of representatives from the national fish workers' forum that called on them to discuss problems of fishermen here.

The forum was informed that the issue of increasing the excise duty concession on diesel supplied to fishermen was under the consideration of the government.

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INDIAN LIQUOR REPORT HIGH SALES IN '00

At a time when international liquor brands posted negative sales growth, Indian brands, which are among the 109 top millionaire spirit brands in the world, have shown an impressive growth in sales and volumes. Last year, international brands like Johnny Walker Red Label posted a – 1.5 percent sales growth, Smirnoff Vodka was down – 2.5 percent and Bacardi rum by – 6 percent.

Out of the 109 top brands, only 56 liquor brands showed positive growth, 28 brands posted negative growth and the remaining brands had stagnant sales.

Despite numerous bottlenecks in India such as states imposing excise duties on liquor, political parties using prohibition as a tool for winning elections, ban on advertising and marketing of liquor products and the availability of smuggled and spurious alcohol, the liquor industry here is managing to grow.

According to industry estimates, while 67m cases of Indian Made Foreign Liquor were sold last year, only one lakh cases of scotch were sold in the same period. The beer industry witnessed 15 percent growth, with sales of 65m cases per annum.

HEAVY LIQUOR LEVIES SPUR SMUGGLING

The government of India is losing over Rs 500 crore per annum in terms of import revenues due to the sharp increase in import duties on bottled spirits.

The import tariffs on spirits have been increased from 22 percent to 46 percent and in some cases up to 711 percent.

One of the major factors for the high import duties imposed by the government on spirits is said to be heavy lobbying by the local spirits manufacturers.

However, the grey market for imported spirits is thriving as smuggled and counterfeit bottles are selling much cheaper as compared to the ones imported from the official channels.

A black label 750 ml Johnnie Walker bottle imported into the country after pa-

ying import duties costs Rs 3,500 while the same is available in the grey market for less than half at round Rs 1,200.

Import duties on bottled spirits in Asia, range from 30 percent to 50 percent and therefore the reason why the smugglers have got a major boost in their business.

The global spirit majors have also informed the government that the high import duties is against the spirit of the WTO agreement and therefore the duties should be reduced immediately.

8-10 CUPS OF TEA A DAY IDEAL FOR GOOD HEALTH

Dr. John H Weisburger, director Emeritus and a senior member American Health Foundation was recently in India. He believes that regular tea drinkers are usually healthy people.

Tea leaves contain polyphenol oxidase which like other antioxidants help to protect the body cells from a damaging physiological process known as oxidative stress. Although, oxygen is vital to life, oxidation produces free radicals that damage the cells in the human body. Polyphenols found in tea serve as marvellous anti-oxidants which are essential to fight diseases.

Studies by researchers have shown that regular tea drinkers have less heart attacks and lower rate of cancer. Salt of Western nutritional habits, which neutralises toxic agents, has been found in them. Moreover, polyphenols slow down the growth of abnormal cells, thereby, leading to healthy and slow aging. Polyphenols favour those bacteria that are good for the human body and kills those that are harmful.

The caffeine content in coffee is much higher than tea. While a cup of tea contains 40-50 mg of caffeine, the same amount of coffee has 150 mg of caffeine and researches have shown that too much of caffeine is harmful for the body.

However, the tea polyphenols by themselves are also active and regular tea is somewhat more effective than the decaffeinated tea. Soft drinks too have caffeine that are harmful for the body apart from their high sugar content.

If tea is consumed with two percent of milk, then it does not destroy the anti-oxidants. However, any quantity of milk more than that, is not good since milk has a lot of bacteria.

Tea, as a drink has very little harmful effects. However, if very hot tea is drunk it harms the human oesophagus.

COLD CHAIN INDUSTRIES

In order to maintain quality, nutritive value and hygiene safety in compliance with international standards in fresh and frozen fruits and vegetables and other perishable commodities, a cold stream right from the harvesting to consumption level is required. If this is not available and there is any break in the cold chain, it can cause heavy losses to the grower due to biological deterioration.

Currently only two per cent of the fruits and vegetables in the country are processed and to bring this level to even 10 per cent. India requires an investment of Rs. 1,50,000 crore. This would mean an annual investment of around Rs. 15,000 crore. As on date, even though India is the second largest producer of horticultural products in the world, its present exports is less than one per cent of the total world agro trade. The wastage in agricultural products is around 30 to 40 per cent which can be easily equated to a value loss of around Rs. 50,000 crore per annum.

One of the major investments required for tapping the nascent market of agricultural produce is in development of cold storages. Not only, in case of agricultural, but the floriculture industry too needs a lot of cold storage facilities to preserve the flowers when they are transported from one part of the country to another and kept at airports for exports.

A high level government committee has pegged the investment requirement at Rs. 27,000 crore with major investment needed to the tune of Rs. 20,250 crore from the private sector.

One of the main reasons for the slow progress in the cold chain infrastructure development in India is lack of awareness on the very concept of cold chain and how it fits into the existing framework of handling and marketing of perishable commodities.

There are very few players in the cold storage market.

MILMA TO LAUNCH QUOTA SYSTEM

The Kerala Cooperative Milk Marketing Federation Ltd. (MILMA) has decided to lift the temporary ban imposed on milk procurement and introduce a quota system in its place.

The federation had banned procurement in the wake of excess production of milk in the State after the onset of monsoon in May. According to Mr. P.T. Gopala Kutup, Chairman, MILMA, a new dual pricing system for procurement of milk, one for the lean and the other for flush season, is also under consideration of the federation. Now the procurement would be fixed based on MILMA's capacity for processing. The federation would now procure about 15-20 per cent more milk from cooperatives than last year to avoid any inconvenience to the farmers. Mr. Krupa pointed out that the State's dairy farmers would be in dire straits if no controls were imposed on the flow of milk from neighbouring states.

UTTARANCHAL TO PROMOTE DAIRY DEVELOPMENT

The Uttaranchal Government has underlined the need to encourage dairy development in rural areas as an additional source of income for farmers. In view of the potential of milk trade, efforts are on to attract private sector in the field.

The average marketing of milk and milk products, in the cooperative sector, per day was nearly Rs. 12 lakh. Cooperative milk societies has been set up in all district of Uttaranchal. These societies had been providing technical inputs relating to milk production to rural milk producers, marginal farmers and weaker sections.

The pace of progress in the dairy sector, in the State, has been very poor, over the past 50 years. In Kumaon and Garhwal regions of Uttaranchal, only 18 per cent villages could be covered so far by the cooperative sector. Therefore, efforts of the State government would be to focus on strengthening the dairy sector and speed up the development programmes keeping in view the topography of hills, social scenario, resources and potential.

KARNATAKA PLANS DAIRY TECHNOLOGY UPGRADATION

Karnataka, which produces 1.14 crore litres of milk a day, of which 8 lakh goes down the drain, is in the process of a technology upgradation drive which would enable farmers to convert milk into products with a longer shelf life such as milk powder and other such 'value-added' products. The State was undertaking a series of 'developmental activities' to enable farmers to compete in the world market. The measures include the setting up of hi-tech veterinary clinical laboratories in every district of the state. The Karnataka state government wanted that the Centre should come out with a comprehensive dairy development programme to empower local farmers to face and increasing competition from world players to counter this, new techniques of livestock management would have to be adopted.

RESEARCH IN POST-HARVEST TECHNOLOGY

India is the world's second largest producer of fruits and vegetables. It is

true that post-harvest losses in India are very heavy and are around 30 per cent. However, the per capita availability of fruits and vegetables is very low in India. In case of fruits, the daily availability is as low as 85gm while in case of vegetables it is only about 140 gm. However for some fruits like mangoes and grapes, there is a substantial international market. To achieve this benefit India should be focusing on utilising the seasonal advantage. The new Exim policy actually focuses on this.

The Post-Harvest Technology (PHT), division of Bangalore based Indian Institute of Horticulture Research (IIHR) is working out various strategies for extending the shelf-life of fresh fruits, vegetables and flowers. The stress is on improved handling, storage and packing. New product development is being carried out in case of fruits and vegetables like mangoes, bananas, grapes, pomegranates, tomatoes, onions, carrots and cauliflowers. The product range comprises of fruit beverages, juices, dehydrated products, raisins, vegetables pastes and wines.

The varieties and hybrids developed by the institute have already been tested and are being used across various agro-climatic zones. Grapes for instance have tremendous export potential.

IIHR scientists are consultants to the Agricultural and Processed Foods Export Development authority (APEDA). The creation of agri-economic zones with more market information and other facilities would provide better opportunity for the farmers.

The advantage of genetic engineering helps to identify solutions to problems which cannot be solved through conventional methods. The institute is developing watermelon resistant to bud-necrosis virus, tomato resistant to the leaf-curl virus, chillies resistant to fruit rot. Future plans at IIHR include developing transgenic fruits and vegetables with increased shelf-life.

TAX EXEMPTION FOR MILLERS, FRUIT & VEGETABLE PROCESSORS IN PUNJAB

All manufacturers of atta, bread and pasta will no longer have to pay any taxes while procuring wheat and maize from the mandis in Punjab. All fruit and vegetable processors like juice, tomato paste and frozen foods companies will also not have to pay taxes when buying horticultural produce from Punjab farmers.

The Punjab government has decided to withdraw the procurement taxes from nine percent to zero percent for wheat and maize processors, and from five percent to zero for fruit and vegetable processors. All maize processing and starch companies are going to gain immediately as the new crop will come to the mandis October onwards.

Fruit and vegetable processors of frozen peas, canned juices, tomato paste, frozen potatoes, dehydrated vegetables for soups and meals buying from Punjab will be benifitted. The state government owned Punjab Agro Corporation, which has just commissioned two plants for frozen vegetables and another in the wings for dehydrated vegetables, will benefit from not having to pay the five percent tax. However, large atta companies like Cargill, Agrotech, HLL and Godrej, and Punjab's own wheat flour industry will only benefit in the next rabi season as procurement from the mandis is over for '01. The tax exemption is not available to processors if they buy wheat from FCI. This year FCI is expected to be the only wheat seller in the market.

PFA RULES ON IRRADIATED FOODS AMENDED

The government has amended the Prevention of Food Adulteration (PFA) Rules 1955 relating to irradiated foods.

Permissible levels for the maximum and overall average dosage have been prescribed for irradiated food products like frozen, fresh and dried sea foods as well as pulses, according to a government notification.

Similar standards are already available for products like onions, potatoes and spices. There are number of requirements for undertaking the process of irradiation under the PFA rules and these are in line with the provisions of the Atomic Energy (Control of Irradiation of Foods) Rules, 1991 and are to be undertaken in facilities approved and licensed under these rules.

QUALITY STANDARDS FOR MALT-BASED FOODS

For consumers looking to make a distinction between malt and malt-based foods, the Prevention of Food Adulteration Rules (1955) has been amended to introduce minimum quality standards for malt-based foods.

Shoppers who buy various products like Horlicks, Boost, Nutramul, Complan, Maltova and Bournvita – without realising whether it was a malt food or a malt-based food product. Now they will be able to read the fine-print and then buy the relevant product. This notification is believed to be in response to popular demands from the industry on the issue.

The recent notification, besides outlining the distinction, also lays down the standards that the products will have to conform with regard to parameters such as moisture, alcohol acidity, total proteins, total plate counts and the like.

The need to introduce minimum standards on these products was imminent considering the fact that these products have a wide consumer acceptability, particularly among children, pregnant women and elderly people. The standards were laid down only after research and had been conducted on the existing malt-based products in the domestic market.

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NEW TECHNOLOGY FOR FLAVOURED GINGER OIL

Indian scientists have developed a novel and commercially viable technology for processing fresh ginger and obtaining flavoured ginger oil, which promises to be a tremendous export potential.

This technology was developed by the council of scientific and industrial research's (CSIR's) Regional Research Laboratory at Thiruvananthapuram. A fresh ginger processing plant has been set up on a turnkey basis by the laboratory in the Ukrul district of Manipur.

The Ukrul plant with a processing capacity of 10 tonnes per day is part of the CSIR's initiative towards realising higher value from low-value-resources, through the application of science and technology. The aim is also to assist the local industry and the people to derive better costs from hitherto unutilised or under-utilised resources.

It may be mentioned that India is the largest producer of ginger in the world with the north eastern region alone accounting for 40 percent of the total output in the country.

PAKISTAN TO BUY 50,000 TONS OF INDIAN SUGAR

Pakistan is likely to allow the import of at least 50,000 tonnes of pending Indian refined sugar orders in August, ignoring industry demands to cancel the old import deals.

The Pakistan Sugar Mills Association (PSMA), which had stepped up pressure on Islamabad to cancel all old import orders of Indian sugar says cheap imports have made locally produced sugar less competitive. An association official said that despite the ban on Indian sugar imposed in March some traders had opened back-dated L/Cs". The government had banned the import of Indian sugar in March. At the time of imposing the ban, Islamabad informed the association that L/Cs for the import of 50,000 tonnes of sugar were still to be utilised. Pakistan's annual processed sugar demand is around 3.3 m tonnes.

SPICE EXPORTERS WIN ANTI-DUMPING CASE IN US.

A petition to impose anti-dumping duty on paprika oleoresin imports from India into US has been decided in favour of Indian exporters after they, under the banner of the All India Spice Exporters Forum, successfully defended the case.

The United States International Trade Commission (USITC) decided on a 6-0 vote that the allegations of dumping were baseless and dismissed the case.

The issue was raised by Rezolex, manufacturers of paprika oleoresins in the US which filed a petition in the USITC to impose anti-dumping duty on imports of paprika oleoresin from India. Rezolex argued that imports of this product from India hurt the interests of the domestic producers. The chairman of the All India Spice Exporters Forum (AISEF). Mr MSA Kumar, reportedthat the Indian cap was well presented explaining that India has an inherent cost advantage. We presented the case well and explained that the Indian peprika oleoresin have an inherent cost advantage. The raw material cost in India is lower compared to other countries. The paprika or the coloured chilli is produced in Baidagi by the small and marginal farmers.

The paprika produced in many places in the US has good colour but no pungency. On the other hand, the Indian coloured chilli has both colour and pungency. As a result, Indian manufacturers are able to separate out both streams, namely the colour and pungency.

IMPORTED FOODS TO HAVE 60 DAYS SHELF LIFE

Keeping consumer's interest in view the government has decided to regulate import norms. All imported edible products should have at least 60 days shelf life at the time of import. This move is aimed to prevent sale of these products after the expiry date.

The Directorate General of Foreign Trade (DGFT) has issued a notification to enforce the two conditions. "Imports of all edible and food products, domestic sales and manufacture of which are governed by the prevention of food adulteration act '54, shall also be subject to the condition that, at the time of importation, the products are having a valid shelf life of not less that 60 percent of the original shelf life," says the notification.

The shelf life of the product is to be calculated on the basis of the declaration given on the label of the product, regarding its date of manufacture and the due date for expiry.

The notification also stipulates that sanitary import permit is necessary for import of animal products. In accordance with the conditions of livestock importation act '98, and amended by livestock importation (Amendment) Ordinance '01, import of these products would be subject to meeting sanitary conditions.

Import of meat and meat products will be covered under this stipulation along with poultry products, tissue or organs of pig, sheep, goat, egg and egg powder, milk and milk powder, bovine and pet food products of animal origin. Import of these products will not be allowed without a sanitary import permit.

DNA TECHNOLOGY TO CLASSIFY BASMATI RICE

A DNA marker technology has been developed by Indian Scientist at the centre for DNA Finger printing and Diagnostics in Hyderabad. The DNA marker Technology will help in detecting the quality of basmati rice and government will be able to face the stiff international competition in the multi-million dollar basmati rice market.

CDFD intends to set up an automated DNA marker certification facility centre in its campus that can analyse 60 rice samples a day.

The government had been particularly concerned about the so-called 'super' basmati and basmati No 385 exported by Pakistan claiming these to be superior to Indian varieties.

The evolved varieties – obtained by crossing pure basmati with semi-dwarf rice varieties – have the aroma and grain size of basmati but still far short of typical basmati in cooking qualities. Some 'so-called' basmati rice in market is simply a mixture of genuine or evolved basmati and long grained non-basmati 'Indica' rice.

Mr. Nagaraju's team has studied the genetic profiles of both Indian and Pakistani basmati and now conclusively show that Pakistan's 'super' basmati is an evolved variety and not a true brand basmati and its other variety (No. 385) is far removed genetically from India's ultra basmati (No. 370).

The results obtained scientifically will restore the position of Indian basmati in the international market.

IMPORTS FORCE OUT COCONUT DESICCATION UNITS

Lack of uniform demand, fluctuating prices and stiff competition from Sri Lanka and the Philippines are taking their toll on desiccated coconut manufacturing industry – a culinary product much in demand in northern India.

Though there are 200 registered units in Kerala, Karnataka, Andhra Pradesh and Tamil Nadu, only half of them are working now.

More than 75 units in Kerala alone have been closed down in recent times. There are very few units in the north as coconuts are very rare there.

The product was being sold at cheaper prices by Sri Lankan and the Philippines, who have put up bigger units, due to which cost of production becomes much less, he says.

The problem is further aggravated as heavy working capital is required for putting up a unit to produce desiccated coconut, or in other words, coconut in powder form.

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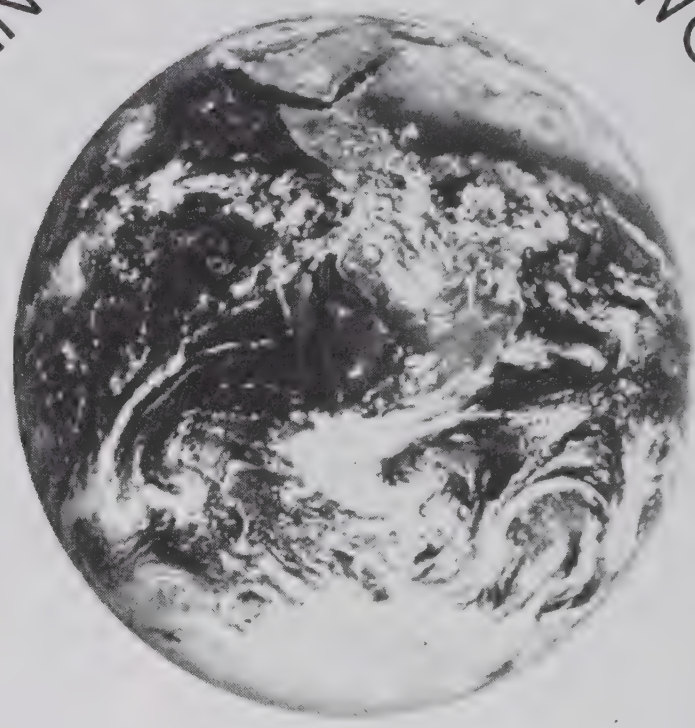

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INTERNATIONAL NEWS

GENETICALLY MODIFIED FOODS FAVOURED BY UN

The UN's human development report claimed that developments in bioscience and information technology would help poor people. New technologies, including controversial genetically modified foods, could be vital to developing countries trying to improve living standards, according to the United Nations.

The annual report's support for genetically modified organisms (GMOs), have provoked strong opposition in rich countries.

The report added that countries such as Argentina and Egypt, which have approved the production of GMOs, show that "developing countries can create biosafety systems that enable them to move forward in managing technological safety".

UN balanced its support for new technology by criticising the trade related intellectual property rights rules. It said they had failed to deliver transfer of new technology from rich to poor countries and had proved too complex for developing nations to register patents on a large scale.

EU FLAYS INDIA'S HIGH DUTIES ON LIQUOR IMPORTS

While removing the quantitative restrictions on imports of liquor, India had levied high tariffs so as to protect the domestic industry. This led to the European Union criticising India for the high tariff levels on liquor imports in the post-quantitive restrictions era and called for a review of the decision.

EU ambassador to India, Michel Caillouet said that the EU had raised the issue with the Indian Commerce Department and was hoping for a review of the decision which was incompatible with World Trade Organisation (WTO) standards.

The duties have raised the prices of these items to levels surpassing those of the quantitative restrictions era, he added.

WTO ADOPTS SUGAR TESTING SYSTEM FAVOURABLE TO INDIA

India has won a major victory in the international sugar quality sweep stakes as WTO's Codex Commission gave into pressure and switched to a testing mechanism favourable to India for its benchmark norms in world trade.

The decision has an immediate advantage for India as it would help resolve all the international trade disputes over quality between Indian suppliers and foreign buyers. The sugar industry's trading arm ISGIEC, has been locked in a dispute with Sucden of France over the quality of sugar sold last year, which is now under international arbitration.

In a decision taken recently the Codex Commission announced that henceforth Method 10 would be the testing mechanism for resolving any international trade dispute in sugar.

Till now the Codex was using Method 9, which disadvantaged Indian sugar because the tests consistently showed it to have below 150 icumsa quality. According to international trade norms, the lower the icumsa level, the better the quality of sugar.

Method 9 was fundamentally flawed as it was designed for testing beet sugar produced by the European Union and not cane sugar produced by countries like India, Cuba, Brazil, Colombia, Thailand and Australia. As a result, when cane sugar was tested, it showed poor quality.

In contrast, the newly adopted Method 10 is designed especially for cane sugar. It also has the flexibility to correctly test beet sugar upto 60 icumsa.

The switch from Method 9 to Method 10 was spearheaded by India in 1998, with other cane producing nations later joining in. The first battle was at the International Commission for Universal Methods of Sugar Analysis (ICUMSA), which is a technical body for establishing quality codes and tests for all types of sugars.

PEPSICO vs SAN MIGUEL

PepsiCo had been in talks with Carlyle, the private equity group, to purchase Cosmos for about $270m.

San Miguel too was in talks to acquire Cosmos from its parent RFM, a food based conglomerate, for an undisclosed price.

San Miguel already controls Coca-Cola Bottlers Philippines, acquired in February from Australia's Coca-Cola

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matil. Coca-Cola accounts for about 7 percent of the local soft drinks market, worth about 50bn pesos ($943m) a ear.

PepsiCo sells about 100m cases of oft drinks in the Philippines, accounting for 20 percent of the market. Its ottler is Pepsi-Cola products Philipines, a joint venture with local company, Guoco.

A successful bid for Cosmos would aise San Miguel's market share to about 0 percent, according to analysts.

PepsiCo had to bid for Cosmos if it as to avoid being overwhelmed by San Miguel and Coca-Cola, the market anaysts further added.

The earnings of PepsiCo showed a emarkable rise with the introduction of ew Frito-lay Snacks such as Bistro hips, increase in sale of its water brand quafina and Sobe the juice and tea line cquired last year. Pepsico now generates about 60 percent of its profits from he Frito-Lay snacks division. For the ast several years, PepsiCo has embarked on a strategy to leverage its nack and beverage business.

The results continue to highlight the growing importance of potato chips and beverages, such as water, as drivers of growth in a company best known for its cola drinks brand, Pepsi-Cola.

DAIRY DNA

The UK Food Standard Agency have developed a $1 million scheme jointly with the European Commission, France, Germany, Spain, Italy & Austria to detect dairy DNA. The researchers at the Central Science Laboratory in York are developing tests to ensure that cheeses with protected classification are genuine. Experts are analyzing a number of milk, butter and cheese samples from different British regions to identify pattern or finger print, which makes certain products unique.

The majority of cheeses traded in the EU are classified according to the region of production and for the cheese making methods. These different techniques result in a wide range of cheese types, some which command an enviable reputation having a high price value. Sometimes inferior cheese is passed off as premium product. The scheme is a part of clamp down on food fraud.

HERBS AND SPICES FOR GOOD HEALTH

Nutrition scientists of CSIRO, Australia's largest scientific and industrial research organisation have found that herbs and spices not only give taste to food but are also good for the health. "Across the world, some varieties of herbs and spices have been investigated in relation to cancer and heart disease risk, improving memory and alleviating nausea," research nutritionist Lynne Cobiac said. Traditional Asian cuisine has long been appreciated in this country for both taste and the variety that they offer. Now scientists have also added health perspective to these cuisines.

Ancient medicine in India and other older civilisations had identified the medicinal and nutritional values of spices and herbs thousands of years back.

"Recent research from CSIRO Health Sciences and Nutrition in Adelaide has proved the anti-oxidant properties of curry leaves, while work is continuing to assess scientifically the antioxidant properties of ginger. "Researchers are working to ascertain how much of each herb and spice we need to consume to gain their beneficial effect, but some quantities are already known," she said.

Beside curry leaves and ginger the scientists have also mentioned garlic as a good insurance against cholesterol if consumed daily. Garlic, a CSIRO media release says, can thus help in fighting heart disease in a very positive manner. Garlic, often detested for its smell, has also garnered appreciation from Australian scientists for its anti-carcinogenic properties. Other ingredients used extensively in Asian cooking, gingko biloba, is also under the CSIRO microscope as it is said to be helpful in improving memory and cognitive function.

With identification of medicinal properties of some of the herbs and spices in Asian cuisines, now CSIRO scientists are trying to identify the active beneficial component and find the best way to optimise their effects. But there is still a gray area as far as this process is concerned as the scientists are not sure whether a component separated in this way would retain its potency or not.

FOOD & DRINK PACKAGING

With many very similar food and drink items on display, packaging can be the deciding factor in purchase. It is a challenge to suppliers and manufacturers to produce eye-catching and innovative items. Added value and convenience, such as resaleable packaging, will also affect purchase patterns.

Since January 2000, packaging not complying with the Essential Elements section of the EC Packaging Waste Directive has been prohibited within the EU. Briefly, packaging should have the minimum negative impact on the environment, and it should be suitable for recycling or reuse.

UK puts the onus of this compliance on the brand owner or the importer of the packaged goods themselves. This means that suppliers will be unable to distribute certain packaging products, particularly if their goods are imported, and will not even be able to repackage goods if the packaging waste cannot be disposed of. Therefore, this legislation goes some way towards creating a climate in which suppliers become more responsible with their packaging materials and waste through the supply chain.

The food and drink packaging industry is estimated to be worth just under £6.7 billion by the end of 2000. Of this, paper and board make up the largest share. However, plastics are growing most quickly. Both metal and glass have seen slight falls in market value, as cheaper and more versatile alternatives are found.

Ready meals are increasingly available for either conventional oven or microwave. This has had a detrimental effect on the metal sector of the food and drink packaging market. Dairy products and soup have also seen packaging innovation.

The biggest changes, however, have come in soft drink packaging. The advent of the 330 ml and 500 ml PET bottle has intensified competition with cans and glass. There have also been many changes in beer packaging, allowing the consumer to have a more pub-like product in the home.

There is likely to be continued growth within plastics, particularly with PET bottles. As consumers demand convenience as well as environmental friendliness, there will be a need for better education as to which products damage the environment (and to what degree). Growing interest in organic food and drink means that packaging allowing for a longer shelf-life, without introducing additives to the food, will become increasingly important.

BAN ON MEAT IMPORTS

The Saudi Arabia has extended ban on import of all mutton and beef prod-

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ucts from Arab, African and Asian states to prevent the spread of foot-and-mouth disease in the Kingdom. A trade circular issued by the Ministry of Commerce said the temporary ban covered all mutton and beef products from Gulf Arab and African states, in addition to Syria, Jordan, Yemen, Pakistan and China. The decision to ban imports has been taken in the light of reports by the International Epizootic Office (OIE) – the world's animal health organization – and recent media reports on cases of foot-and-mouth in several countries. Pursuant to the order of the Saudi Commerce Ministry, Saudi authorities have seized 11 consignments of Indian meat, weighing thousands of tons, on suspicion that they originated from countries where the foot and mouth disease was detected.

EU MOVE ON GM FOODS MAY RAISE TENSIONS WITH US

The European Union will have the world's most stringent rules on the labelling of genetically modified (GMO) foods under proposals agreed upon by the European Commission.

The Commission overrode concerns which would further sour trade relations with the US. Countries like US, Canada and Argentina feared that the system would hit their exports and it could be contrary to World Trade Organisation rules.

To take effect, the plans must be approved by EU governments and the European Parliament.

The new regulations would set up a centralised approvals process for authorising GMOs for food or feed. They would also establish a detailed system to trace GMOs throughout the food chain from farm to supermarket and, most controversially, require all foods derived from GMOs to be labelled as such, even if they no longer contain any modified DNA or protein.

Products would be exempted from labelling only if they contained labelling, only if they contained GMO material by, accident and it was less than 1 percent.

Non-approved GMOs that found their way accidentally into food would be allowed up to a threshold of 1 percent, as long as they had received a positive assessment from EU scientists.

"The provisions for traceability ensure a high level of environmental and health protection and pave the way for a proper labelling system," said Margot Wallstrom, EU environment commissioner.

PACKAGING INDUSTRY

In times of economic slump, when manufacturers are producing and selling less, they need less cardboard to package their products, so the packaging industry has become a tried and trusted bellwether.

While some data recently showed what could be encouraging signs that production might be on the rise, second quarter earnings of major paper and packaging companies suggested that a turn-around might not be on the cards yet.

Shipments of corrugated boxes – used to pack everything from major appliances to boxes of tooth-paste-have edged up in the last few months, from 2.5m tonnes in February to 2.7m tonnes in May.

But a spokesman for the American Forest and Paper Association said, the projected total for the year is still expected to be down about 10 percent from '00.

Similarly, shipments of containerboard, a key ingredient of packaging, declined by 1.5 percent in June on an average-week basis. This is the first time since last September that the decline was less than 3.6 percent.

PET FILMS FOR PACKAGING

A Worldwide study carried out by PCI Films Consulting, based in the United Kingdom, reveals that inroads made by alternative storage and delivery technologies (CD, DVD, Internet, etc.) could drastically reduce the thin-film volume utilized in magnetic tapes for audio, video and data storage. The volume of PET films used in the magnetic tape market has reached its peak and is predicted to decline by an average of 7.5 per cent annually over the next five years. As PET film producers begin to experience falling demand for their product in one of the major end-use markets, critical decisions are inevitable in order to utilize the existing production capacity.

An innovative biodegradable polymer, with special controllable solubility in water, is expected to form the basis of a variety of products for a wide range of industries. Developed over a 10 year period by Environmental Polymers, the United Kingdom, the non-toxic polymer is manufactured in pellet form under the trade name *'depart'*. Presently being used as a film for products like biodegradable composting bags, it is expected that thermoformable sheet will soon be available, and injection and blow moulding will be feasible. Different formulations of *'depart'* are in advanced stages of development. Products made from *'depart'* are fully waterproof at 35°C but dissolve in water at 90°C, with all the residues non-toxic.

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INDIAN
TRADE FAIRS & CONFERENCES

FOODTECH 2001
Venue: Kolkata
Date: Sept. 28 – Oct. 1, 2001

FoodTech India 2001 is organised by Intech Trade Fairs Pvt. Ltd. and sponsored by Department of Food Processing Industries, Government of West Bengal.

The need of the hour is development of food processing and preservation technology to avoid wastage due to perishable nature of foodstuffs. **Foodtech India 2001** aims at highlighting the technologies and equipment for this purpose, as well as the variety for foodstuffs and beverages available in the country.

Scope of the Exhibition: • **Food:** All kinds of Food products and Beverages • Dairy products, Soft Drinks, Mineral Water, Health Drinks, Fruits, Vegetables and Nutritious Food (Processed/ Packed) • **Food Ingredients:** Food Grains, Edible Oil, Spices. Essences, Coloring and Additives and Readymade Masala, Dry Fruits, etc. • **Machinery & Equipment:** Food Processing, Food Packaging, Food Preservation and Storage, Cold Storage Systems, Refrigeration, Dispensing Equipment, Air and Water Pollution Control Equipment • **Kitchen & Domestic Appliances:** From Ovens, Grills, Mixers etc. to Soda Makers, Microwaves etc. • **Hotel & Restaurant:**Equipment and Table Wares • **Facilitators:** Banks and Financial Institutions, R & D Institutes, Trade Associations, Govt., Agencies, Export Promotion Councils, etc.

For more details contact:

Intech Trade Fairs Pvt. Ltd., 307-308, 3rd Flr., Acme Indl. Park, Off. I.B. Patel Road, Near W.E. Highway, Goregaon (E), Mumbai 400 063. Tel: 878 0370 / 71 / 72, Fax: 022-6902392 / 93, 8780375, Email: intech@bom5. vsnl.net.in

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KISAN 2001
Venue: Bangalore
Date: 18-21 October, 2001

India's largest agri show **Kisan** 2001 will be held at Bangalore. At **Kisan**, the farmer is the focus. Today's farmer is more knowledgeable and more demanding than ever. The need for information brings them to **Kisan** exhibitions. As the largest agri show in India, **Kisan** offers an overview of the latest products, services, research and development, technology advancements, trade news and business opportunities in Agriculture.

Kisan is an opportunity to start a dialogue and establish a fruitful relationship with the farmer and agri trade at large.

For more details contact:

Deccan Exhibitions Pvt. Ltd., No. 57/2, 11th Main Road, Malleshwaram, Bangalore 560 003, India. Tel: 080-3316330, 98451-72383, Fax: 080-3316330, Email: bhavani@ kisan.com, 1170/17B, Shivajinagar, Pune 411005, India. Tel: 91-20-553600, 5537434, Fax: 91-20-5536301,Email: fair@kisan.com

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AHAR 2001
Venue: Ahmedabad
Date: 1st - 4th Nov., 2001

'AHAR 2001' provides an unique opportunity for fresh, frozen and processed food products, food processing machinery and equipment, refrigeration machinery and equipment, packaging material and machinery requisites for hotel, kitchen and catering equipment, utilities, furniture, decoratives etc.

Exhibitor's profile: • Food Products • Food Processing • Machinery and Equipments • Hotel, Restaurants and Catering Products/Equipments • General

For more details contact:

Insite Exhibition Organiser, 18, 1st Floor, Empire Tower, Nr. Associated Petrol Pump, C. G. Road, Ahmedabad 380006. Tel: 079-6449837, 6562080, Fax: 079-6449301, Email: ahar2001@ insite-exhibition.com, Website: www.insite-exhibition.com

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3RD IDFT EXPO 2001
Venue: World Trade Centre, Mumbai
Date: 21-24 November, 2001

The 2nd IDFT Expo held from October 3-6, 2000 at Pragati Maidan, New Delhi was hailed as a grand success by decision makers, dignitaries, industry leaders, scientists, diplomats, farmers and others. Excellent business results were reported by the participants, quite a few joint venture proposals were initiated and long term business transactions were generated.

The 3rd IDFT Expo is being organised jointly with KMI, Germany, the largest trade fairs organiser on agriculture in Europe in association with TAFCON DLG-German Agricultural Society. Germany will sponsor the event with co-sponsors All-India Food Processors' Association, All-India Ice Cream Manufacturers' Association, All-India Bread Manufacturers' Association and Federation of Biscuit Manufacturers of India.

High power German Government and Trade delegations have planned to visit the Expo. Germany will put up a national pavilion displaying the technological and innovative advances made by food processing and dairy industries of their country.

Satellite Programmes like Technical Seminars on Dairy and Food Processing Industries have been planned. Leading experts from overseas and India will address the visitors and delegates from overseas and neighbouring countries.

Liberalisation and globalisation of economy makes India a very attractive and profitable destination for overseas business community and in this context, the Expo offers huge potential for: Joint ventures, Investments, Export and Import tie-ups, tie-ups for latest technologies and practices, state-of-the-art equipment and machinery, technical consultancy, business tie-ups, promotion of products, and so on.

For more details contact:

Tafcon Projects (India) Pvt. Ltd., C/60, Nizamuddin East New Delhi. Tel: 435 21 41/44/82/84, Fax: 011-435 52 15, 435 40 77, Website: http://www. tafcon.com, Email: tafcon@del2. vsnl. net.in

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FOODPRO 2O01
Venue: Chennai
Date: 8-11 December, 2001

Organised by Confederation of Indian Industry (CII) **FOODPRO 2001** – India's flagship & premier Food Business Event is a comprehensive business fair featuring a 4-Day International Exhibition & Conference on Food Industry, and will highlight and showcase the

tremendous opportunities across the entire Agricultures, Food and Dairy Chain.

FoodPro 2001 – The Highlights: • 4-Day International Exhibition • Conferences & Investment Seminars • Technical Sessions & Technology Forums • Parallel Events & Food Festivals • Exclusive State Government Pavilion • 150+Exhibitors.

FoodPro 2001 – Opening Markets: Market opportunities across the entire Agri/Food chain by way of Investments, Joint Ventures, Technology Transfers with Indian Companies or Exporting to India for • Modernisation of the Food Chain • Agri-Inputs (High Yielding Seeds, Processing Varieties) • Agriculture (Farming Techniques, Inputs, Basic Mechanism) • Procurement & Storage (Material Handling, Packaging, Cold Chains, Transportation, Grading Systems) • Processing (Large Scale Facilities, Processing and Packaging Machinery & Technologies) • Retailing (Cold Chains, Retail Outlets) • Exports of Food & Agricultural Products including Processed & Packaged Foods.

The **FoodPro 2001** Exhibition will attract all the players in the Agriculture, Food, Dairy Businesses from all over India including Food Processors, Retail Chains, Hotel & Restaurants, Importers who would be using the Exhibition as a forum to source new Technologies, Equipments, Packaged & Processed Food and Dairy Products as well as fresh agro producers.

Exhibition Profile: Technologies, Equipments & Systems: Food Processing Equipment, Preservation Systems, Refrigeration Technology, Packaging Systems, Beverages, Processed Frozen Foods, Dairy Equipment & Technology, Dairy Products, Poultry Equipment and Technology, Poultry Products, Automation & Control Systems for Food Processing Equipments, Printing & Packaging, Storage and Handling Asceptic Facilities.

Food Products: Processed & Frozen Foods, Packaged Foods, Beverages – Tea, Coffee, Alcoholic & Non-Alcoholic Beverages. Dairy Products – Milk, Butter, Ice Cream, Cheese, etc., Horticulture Products.

FoodPro 2001 Conferences: CII will be organising a host of International Seminars and Conferences in areas such as bio-technology, water management, food processing, livestock, cold chain technologies, IT & agriculture, agri-infrastructure, agro-packaging, WTO & agriculture and food laws.

Brand New Exhibition Venue: The FoodPro 2001 Exhibition will, for the first time, be held at the ITPO Chennai Trade Centre – the Region's largest as well as Newest Exhibition Centre.

For more details contact:

Confederation of Indian Industry Business Fairs Division, 35/1, Abiramapuram, 3rd Street, Alwarpet, Chennai 600 018., Tel: 0091-044-498 7648, 466 0571, 466 0291, 466 0773, Fax: 0091-044-466 0312, Email: j.shanker@ciionline.org / v.kuppuswamy@ciionline.org

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We are Interested in (Please Tick & Return)

Exhibiting in the Exhibition		**Name:** _____
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Foodpro Conferences & Seminars		**Organisation:** _____
Visiting the Exhibition		**Address:** _____
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		Fax: _____
		Email: _____

Please Complete this Form and Mail / Fax to:

J. Shanker
Confederation of Indian Industry
Business Fairs Division
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International FoodTec India 2002

Chennai Trade Centre, Chennai, February 9 - 12, 2002

FOCUS AREAS

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- PACKAGING TECHNOLOGY
- LOGISTICS / PRODUCTION TRANSPORT
- MEASURING AND REGULATIONS SYSTEMS
- ANALYTICS
- HYGIENE
- REFRIGERATION TECHNOLOGY
- RESEARCH AND DEVELOPMENT
- STATE OF THE ART MACHINERY & SERVICES ETC.

Concurrent Exhibitions

- INDPACK 2002 International
- INDPRINT 2002 International.

Come February, India is playing host to one of the biggest International Food Exhibition witnessed in recent times - International FoodTec India 2002. Bringing it to India, is one of the world's leading German Trade Fair Organizers, Koln Messe International GmbH (organizers of world's leading show on food technology, ANUGA) in association with CIFTI, the only Indian Partner to this exhibition.

The event will provide the perfect and complete business platform for Indian and Foreign exhibitors to explore untapped opportunities in the ever expanding and globally competitive field of food processing by bringing them under one single roof.

CIFTI in its role of being the apex industry association catering to the needs of food industry providing institutional and technical support to its members will organize technical seminars on this occasion attended and addressed by experts, professionals, participating company representatives, both domestic & foreign and senior government officials.

So you get to witness not one but two mega events at the same place.

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For any further details, please contact:
Ms Shweta Ahuja
Public Relations Officer, CIFTI

Confederation of Indian Food Trade and Industry
Federation House, Tansen Marg, New Delhi - 110001
Tel no.: 011 - 3736305, 3738760 - 70 (11 lines)
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Trade Enquiries Solicited

INTERNATIONAL
TRADE FAIRS & CONFERENCES

PRINT + PACK EXPO 2001
Venue: Hong Kong
Date: 29th Aug. - 1st Sept., 2001

Organised by Business and Industrial Trade Fairs Ltd., **Print + Pack Expo 2001** is the largest and most sophisticated exhibition for printing and packaging industry being held regularly for the last fifteen years. It incorporates the 2nd Asian Sign Technology & Materials Exhibition and The International Graphic Arts Technology for Asia.

Print + Pack Expo is dedicated to the prosperous printing and packaging industries in Asia. It aims to bring together the world's latest technologies for the Asian printing and packaging market and will be the best market place for international suppliers and buyers.

On current events 30,000 international visitors are expected from 34 countries at the exhibition.

Concurrent events: Print + Pack 2001 is one of the highlights of the 2001 **Asian Industrial Expo**. Concurrently held under the roof will be The International Machine Tools and Metalworking Machinery Exhibition for Asia, and The International Auto Parts, Accessories, Maintenance and Inspection Equipment Exhibition, which are going to demonstrate a full spectrum of up-to-date industrial technologies and equipment.

Exhibits: Pre-press and post-press technology, printing machinery and materials, industrial printing machinery, screen/pad/hot-stamp printing, printing services, paper converting, binding equipment, packaging machinery and materials, and ancillary equipment, signs and sign making equipment, accessories and substrates, graphic arts software, desktop publishing technology, CTP, DTP, electronic and multimedia publishing technologies, flexographic printing supplies, printing materials and accessories, etc.

For more details contact:

Mr. Brian Leung, Business & Industrial Trade Fairs, Unit 1223, 12/F, HITEC, 1 Trademart Drive, Kowloon Bay, Hong Kong, Tel: 852-2865 2633, Fax: 852-2866 1770, 2865 5513, Email: enquiry@bitf. com.hk

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DRINKTEC - INTERBRAU 2001
Venue: Munich
Date: 20th - 27th Sept., 2001

Drinktec - Interbrau 2001 is the world's largest fair for beverage technology featuring latest technology for manufacturing, bottling and packaging beverages of all kinds through to liquid foods.

The exhibition will present innovative beverage filling technology and innovative packaging solutions. It will also reflect the growing significance of non-alcoholic drinks, their world wide markets and the technology to serve these markets. All the latest technologies in manufacture, bottling and packaging of drinks of all kinds, through to liquid food, will be presented at **Drinktec-Interbrau 2001**. Entire systems and large-scale machinery will be set up at the fair to demonstrate the products in action.

The Product range spans the entire repertory of the beverages industry. The key areas are: • Machinery and plant for malting and beer production and for the manufacture of alcoholic and non-alcoholic drinks • Filling and packaging machinery and labelling, storage, consignment and transport technology • Filtration and separation technology, measurement technology, process automation and control technology • Automation and new software solutions for all manufacturing and business processes • Packing materials and packing aids • Energy and water supplies, raw materials and raw material products • Fittings for hotels and restaurants.

For more details contact:

Messe Munchen GmbH, Projektleitung drinktec interbrau, Messegelande, D-81823 Munchen, Tel: (4989) 949-20630/20631, Telefax: (4989) 942-20639, Email: newsline@messe-muenchen.de, Website: www.drintec-interbrau.de

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FIRST HALAL FOOD CONFERENCE AND SAUDI EXHIBITION
Venue: Riyadh, Saudi Arab
Date: 24th - 27th Sept., 2001

Promosalons, the French Trade Promotion Council, in collaboration with the Government of Saudi Arabia, is organising the first Halal Food Conference & Saudi Exhibition in Riyadh between the 24th and 27th of September 2001. The Conference shall be graced by over 1000 food and beverage professionals from across the globe, dealing not only in Halal meat, but also various other food and beverage products such as poultry, non-alcoholic drinks like fruit juices and dairy products.

The Halal Meat Conference shall bring together three events in one: An international Scientific & Economic Symposium on halal food products.

A pre-arranged meeting program for companies and institutions, both sellers and buyers of halal meat as well as accompanying foods is also planned.

A Saudi food exhibition: Keeping in mind that Saudi Arabia imports meat products worth 7.2 billion dollars (a demand which shoots up considerably during high season when SA receives some 5 million visitors), the Halal Conference would provide an ideal opportunity to Indian professionals to highlight the strenghts of their products before an international gathering, to relaunch operations in the Gulf and to consolidate their position in this sector.

As a special concession to Indians, and in the hope of facilitating reestablishment of healthy contacts with consumers of halal products the world over, Promosalons shall be happy to offer interesting concessions to local businessmen and government bodies who might wish to participate in the Halal Food Conference. And should you be looking for a travel package to Riyadh, inclusive of air tickets, hotel accommodation and airport transfers, Promosalons invites you to contact without further delay our appointed travel agent at the following address.

For more details contact:

Arun Hattangadi, Head M.I.C.E., Travel Corporation (India) Ltd., Chander Mukhi, Nariman Point, Mumbai 400021. Tel: 022-2021881/2027120, Fax: 022-2029424, Email: leisure sales1@tci.co.in, Website: www.halal food.org.sa

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WORLD FOOD MOSCOW 2001
Venue: Krasnaya Presnya, Moscow
Date: 25th - 28th Sept., 2001

World Food Moscow 2001, Russia's Premier International Food & Drink Exhibition and the largest of its kind is organised in Russia by ITE Group Plc, the world's leading exhibition organiser in emerging markets. Over 525 exhibitors from 44 countries are expected to take part in the exhibition. The exhibition will provide agateway into the vast

and emerging food markets of Russia.

For the first time **World Food Moscow** will be co-located with **Sweets Expo Moscow, the International Sweets and Confectionery, Biscuit and Pastry Exhibition,** which has attracted confectionery Associations from countries including Brazil, Spain and Poland.

ITE Asia Pte Ltd. is now organising participation of Asian companies at **World Food Moscow 2001**.

• Cocoa, Chocolate and chocolate confectionery • Biscuits, cakes and waffles • Crackers, salted cookies, snacks • Sugar confectionery, marzipan articles, filled sweets, caramel • Semi-finished cake ingredients • Children's confectionery • Diabetic and diet articles • Technology • Flavours, colourings, additives used in confectionery.

For more details contact:

Loy Joon How, Gen. Manager, ITE Asia Pte Ltd., 89 Short Street, #B-11, Golden Wall Centre, Singapore 188216. Tel: 65-3360655, Fax: 65-3379005, Email: joonhow@pacific.net.sg

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LABELEXPO EUROPE 2001
Venue: Brussels, Belgium
Date: 26th - 29th Sept., 2001

Organised by Tarsus Martex a part of Tarsus group Plc, the **Label Expo Europe 2001** will be showcasing new developments in narrow web printing including flexible packaging, folding cartons and digital printing.

Among the many new highlights of **Labelexpo Europe 2001** will be the 'visitor trails'. The marked trails will be used to direct visitors to the stands for flexible packaging, folding cartons, digital solutions, labelling solutions and converting solutions. This will make it easier for visitors to find their way around this extensive event. Educational seminars are an added feature to the **Labelexpo Europe 2001** exhibition.

About 390 companies are expected to take part in this event.

For more details contact:

Gillian Pattison, Press Officer., Tel: 44(0)20 8846 2700, Email: gpattison @tarsus.co.uk, Joanne Watts, Press Officer., Tel: 44(0)20 8846 2743, Email: jwatts@tarsus.co.uk

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INTERNATIONAL FOOD FAIR 2001
Venue: Sharjah, Dubai
Date: 4th - 9th Oct., 2001

International food fair delivers the focussed buying power of the Middle East region's retail, food service, processing, importing and wholesale companies to your stand, being the region's established trading forum that interfaces food manufacturers, buyers, suppliers and decision-makers.

Opportunities abound at the show for making sales on the show floor and generating leads for follow-up in the Middle East market. Being a cost-effective resource for building relationship and conducting food business, it can be your ideal strategy to either launch yourself or strengthen your presence in this market.

Show Profile: Fresh, frozen and packed food; Dairy products, beverages, spices, grains & cereals; Farm supplies and equipment, including fertilisers, manure and machinery; Food processing & packaging machinery appliance and materials.

Special package: US $ 2,500 offered which includes 9 sqm shell scheme stand, one double room in a Sharjah hotel for six nights and two visas, airport pickup and drop and daily transport to the fair ground.

For further details, contact:

Ms. Kangan Uberoi, Exhibitions India Pvt. Ltd., A-17, 2nd Floor, DDA Office cum Shopping Complex (Near Moolchand Flyover) Defence Colony, New Delhi 110 024. Tel: +91 11 4638680 -84 • Fax: +91 11 462 3320 / 463 3506 • Email: comnetexhibitions@vsnl.net

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ANUGA - 2001
Venue: Cologne, Germany
Date: 13th - 17th Oct., 2001

Anuga 2001 is the world largest trade fair for food and drink industry.

Over 40 Indian companies are expected to take part in Anuga. A large number of Indian businessmen from states of Maharashtra, Delhi, Tamil Nadu, Kerala, Karnataka, Punjab, West Bengal and Assam will visit the fair to explore new business avenues. In order to improve India's export prospects, India Trade Promotion Organisation will be putting up an Indian Pavilion to showcase exclusive Indian products such as spices, cashew nuts, tea and coffee, marine products as well as processed food items.

Over 6000 suppliers from 100 countries will be on hand at Anuga to exhibit a unique range of products covering almost all areas of the food and drinks industry. Over 2 lakhs visitors are expected from 152 countries. The fair will also showcase the latest technology and services for the grocery trade, the catering sector and the vending trade.

Discussions, presentations and workshops offered in the supporting programme will all be oriented towards current trends and topics in the industry, exotic influences are having a substantial impact on current food trends for Indian business, Anuga is the perfect place to establish vital contacts with business partners around the world.

For more details contact:

Indo-German Chamber of Commerce, Maker Towers 'E', 1st Floor, Cuffe Parade, Mumbai 400 005. Tel: +91-22-2186131 (9 Lines), Fax: +91-22-2180523, Email: igcc@giasbm01.vsnl.net.in

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FOOD IN EUROPE, BUILDING IN SAFETY
Venue: Valencia, Spain
Date: 15th - 17th Oct., 2001

Organised by European Hygienic Design Group (EHEDY) "Food in Europe; Building in Safety" is a conference where international experts will present a global view on hygiene. Topics under discussion are, need for hygienic engineering in relation to product and consumer safety, zoning and layout, building details, maintenance, industrial services and utilities, equipment and its installation, designing for cleaning, traceability and distribution. This conference is for people involved with food manufacturing.

For more details contact:

Website: www.ainia.es/safetycongress

EUROCAFT 2001
Venue: Berlin, Germany
Date: 5th - 7th Dec., 2001

The European Conference on Advanced Technology for Safe and High Quality Foods will summarise and critically discuss European research in the field of existing and emerging advanced food technologies. Delegates from industry, universities, research institutes, EC, government and consumer organisations will have the opportunity to exchange knowledge and discuss positive and negative aspects of the technologies. This is of major importance with respect to process/product development and to improving product quality and safety. The scope of the conference will encompass improvements of existing process technologies, the development of new, advanced technologies that will be applied to food processing in the future, and the integration of food production and food processing chains.

For more details contact:

Email: eurocaft@heatonconnexion.co.uk • Website: www.eurocaft2001.com

PACK EXPO Las Vegas 2001

Attendees at PACK EXPO, Las Vegas 2001, September 10-12, will see some impressive machinery. Less visible is the enabling software, which plays a growing role in increasing packager productivity from the earliest design phase to delivery to the final customer.

Software makes it easier to do a host of tasks and sometimes makes possible what otherwise would be impossible, or at least impractical. *Like a good magician, you don't see software working but the results can be amazing.*

Innovations in packaging-related software can be divided into two broad areas: design and machinery/line operation and are supported by various high-tech devices like sensors, human/machine interfaces (HMIs) and alert devices.

Driving innovation is a demand for simpler operation so equipment is easier to set up, run and troubleshoot, with the goal of reducing the need for operator decision making. "Efficiency expectations continually go up and up," explains Mark Medenwaldt, electrical engineer at Krones, Inc., Franklin, W.I.

Another driver is web-enablement, so systems can be linked via the Internet to take advantage of e-commerce opportunities. "It's rapidly changing the market right now," says Paul Smith, national sales director at ACMA/GD, Richmond, VA. "People are trying to explore how to make use of the Internet," agrees Brad Leonard, vice president, Business Development at CAPE Systems, Inc., Allen, TX a provider of pallet unitizing software. "No one really knows what the tools will be," he adds.

Design Software

One of the most widely used types of packaging-related software calculates the most efficient case sizes and pallet loads, enabling companies to reduce storage and distribution costs. "There's a lot of money to be saved when you look at the synergy between packaging and distribution" says Bill Rehring, founder and director of operations at TOPS Engineering Corp., Richardson, TX, a provider of package optimization software. By optimizing primary packaging sizes to fit one more bag per case, a major snack food maker has realized $7 million in annual savings. The saving are so dramatic because "80-90% of costs are in packaging and distribution," Rehring explains.

TOPS Engineering has registered two domain names, palletpattern.com and palletpatterns.com and plans to introduce PACK EXPO Las Vegas visitors to an Application Service Provider (ASP) version of its Total Optimization Packaging Software. The ASP model is an attractive option especially for smaller companies because it allows the packager to "rent" the program rather than buying the software and investing in hardware and personnel resources to support it.

In an ASP, the software is hosted on a secure site and is easily accessible via the Internet to subscribers, who generally pay a monthly fee. This arrangement enables subscribers to use the software without any worries about hardware and software deployment, maintenance and upgrades. To participate, all a subscriber needs is a computer, modem, web browser and Internet access.

Another packaging optimization software provider, CAPE Systems, Inc., Allen, TX, will demonstrate the latest release of its Cape Pack '99 Millennium Edition software at PACK EXPO Las Vegas. The new release features e-commerce tools and increased flexibility, so the program is easier to use on operating platforms other than Windows. Other features include an ability to compare materials for cost and protective qualities, interface with computer-aided design, enterprise resource planning (ERP) and warehousing systems, store solutions in a packaging information database for future reference, and screen scalability so the program fits on any size screen. Also new is the ability to email reports or access the CAPE web site from within the program.

Operational Software

In today's tight labor market, operators are harder to find and retain and may lack proper training. As a result, packagers want equipment that eliminates decision-making on the part of the operator. "Adding a process layer is the next frontier," says Carl Traynor director of marketing at MOTOMAN, Inc., West Carrollton, OH.

By incorporating process rules into software, operations can be optimized and errors eliminated. This is particularly useful for simulation tools, which are increasingly viewed as a necessity rather than a luxury because it allows packagers to see technology before it is built and the action is programmed, expediting installation and setup. For example, process rules for robotic systems build in reasonable speed ranges, angles of movement and sequences of events, so even personnel not expert in robot motion can quickly create optimized work paths.

Simulation is becoming more sophisticated, too. "Before, packagers were happy if the simulation worked out the robot's motion and path," says Traynor. "Now they want the simulation software to show the interaction of the robot with external peripheral equipment," he reports.

Another demand for software is minimization of custom code to shorten lead times and reduce integration expenses. In response to this wish, MOTOMAN has developed standardized systems for certain applications like palletizing. MOTOMAN's PalletWorld is a complete solution including robot, controller, menu-driven palletizing application software and an integrated gripper package. Standardization reduces engineering costs, increases productivity through highly reliable operation and simplifies customizing and upgrading.

Increasingly, today's machine level software interfaces with line, facility and enterprise wide systems. For example, software for palletizing systems from PaR Systems, Inc., Shoreview, MN, can include an interface to the host sales computer, allowing order info to be downloaded to the palletizer and order-specific loads to be arranged directly on route delivery trucks.

Sometimes the data flows the other way. For inspection systems from TapTone, North Falmouth, MA, software collects and interprets data and generates reports and graphics to record performance history and show trends.

For companies looking to connect their plant floors to their ERP systems, the solution has been largely manual, inefficient and prone to error. Automating this types of function is RSBizWare web-based software from Rockwell Automation, Milwaukee, WI.

Using RSBizWare Batch and RSBizWare eProcedure modules, a pharmaceutical company in the United Kingdom reduced the number of recipes it used from 4000 to six, cut lead time from four days to hours, boosted batch report accuracy to 100 percent and shortened quarantine time from days to hours. The software also ensures complete documentation of quality control observations and corrective actions and provides complete accountability for all materials including partial lots.

The software takes operators step by step through the sequence of actions they must perform with appropriate signoffs, verifications and security clearances. Particularly important for regulated industries like pharmaceutical, the software meets the requirements of the U.S. Food and Drug Administration's Electronic Record and Electronic Signature Rule (21 CFR Part 11). If an operator makes a mistake as he moves through the procedures, it can be corrected, but the

original response remains part of the batch record and includes an explanation of why the change was made. The electronic records allow near real-time reporting to ERP systems, improve compliance and repeatability and simplify data retrieval and analysis. Easy retrieval of complete records can help firms pass audits with flying colors.

Operators work from one or more terminals on the line or from handheld PDA's (personal digital assistants) for added mobility.

Control issues highlight extended shelf life exhibits at Pack Expo, Las Vegas

Several companies planning to exhibit extended-shelf-life (ESL) systems at PACK EXPO Las Vegas 2001, September 10-12, are offering more than just better/faster - precise control is a front-burner issue. They say that customers are demanding it.

Roger Lakey, general manager of Accu-Seal Corp. (San Diego, CA) says his company will display full line of modified-atmosphere sealers featuring precision digital controls. For example, a stainless-steel, NEMA-4 washdownrated, table-top unit, the company's Accu-Med 730, digitally controls seal temperature, time and pressure, completely documents each seal operation, and outputs the data to an Excel database.

Advanced, high speed, closed-loop, programmable logic controlled-based PID controls maintain seal-to-seal repeatability enabling compliance with the most demanding Food and Drug Administration sealing requirements. To support on-going accuracy, the calibration ports monitor and manage seal temperature, time and pressure. The digital advancements also facilitate reduced changeover times.

Circle Packaging Machinery Inc., (Greeen Bay, WI) has upgraded its form-fill-seal (FFS) machinery with electronic servos, notes product manager Steve Joosten. "Electronic servos eliminate clutches and brakes, which boost line speeds and overall productivity." A five-axis, servo-driven, horizontal FFS machine produces four-side-seal pouches with hermetic seals, incorporates Allen-Bradley hardware, programmable logic control and a touch screen operator interface.

Russ Perone, national sales manager for Packaging Aids Corp. (San Rafael, CA) reports enhancements on its ESL systems. For example, its bag sealers will feature standardizing on floating-head controllability. In addition, increased capacity and more complete and efficient fills for bag-in-box applications are provided by a high-speed snorkel vacuum and reserve vacuum tank.

Vacuum Barrier Corp. (Woburn, MA) will show several new models at PACK EXPO Las Vegas 2001, including its NitroDoser liquid nitrogen dispensing system. This system now operates at speeds of 2,000 bottles per minute. In addition to extending shelf life by displacing oxygen in sealed packaging, the injection of liquid nitrogen into containers such as plastic bottles or aluminium cans adds rigidity for greater stacking and shipping efficiencies, resulting in packaging and retail cost savings. Nitrogen dosing also reduces oxygen levels in containers and helps maintain product freshness.

Handling the liquid nitrogen requires considerable expertise. Insulated equipment is essential - liquid nitrogen has a boiling point of -320°F (196°C) at atmospheric pressure and boils away rapidly if exposed to room temperatures - so packaging/production facilities must install appropriate storage, piping, and dispensing equipment.

Aseptic Filling Advancements

Few machines involve the degree of control required of aseptic fillers, which fill commercially sterile products into sterile containers in sterile environments. While most are commonly used for shelf-stable high-acid beverages in drink boxes, a growing number of aseptic fillers are being designed to handle polyethylene terephthalate (PET) bottles. Interest is particularly high for low-acid, shelf-stable applications. To date, only one aseptic filler from Rober Bosch Corp. (Bridgman, MI) has been accepted by the U.S. Food and Drug Administration (Washing, DC) for filling a low-acid, shelf-stable product. It handles an infant formula at Ross Products, Columbus, OH.

Aseptic fillers from Serac, Inc. (Carol Stream, IL) are being used to significantly extend the shelf life of low-acid refrigerated products. A line installed at WestFarm Foods (Seattle, WA) to co-pack NesQuik flavoured milk from Nestle USA Beverage Division (Glendale, CA), is also being used for WestFarm's new line of single-serving products in 12-ounce PET. Aseptic filling gives Darigold DariGo Great White 2% milk and flavoured milk products a 90-day shelf life more than four times the selling period possible with a previous line of single-serving milk.

Innovations in Meat Packaging

PACK EXPO Las Vegas 2001 attendee will see new all-polyester packaging that achieves longer shelf life for case-ready muscle and ground meats. These meats are packaged using multilayer barrier trays and films.

Craig Livingston, vice president, international sales, for Rollprint Packaging Products Inc. (Addison, IL) says, "We're looking at putting meat into all polyester-based packaging for recyclability. The tray will be polyester, which will give excellent barrier properties just by the nature of polyester resin, and the lidding material will be a barrier polyester with a polyester sealant on it. It will be 100% recyclable."

Orics Industries Inc. (College Point, NY) will bring its vacuum-gas-flush tray sealers for modified atmosphere packaging (MAP) to PACK EXPO Las Vegas this September, and is gearing up for an entry into fresh meat packaging.

Alex Gaufman, Orics's sales manager, notes that the vacuum-gas-flush tray sealers consistently achieve the lowest oxygen residual in the industry. "We offer a unique system for MAP, which allows us to have low gas residual and very quick cycle time," he says. This means faster output performance for the customer.

Ilapak Inc., (Newtown, PA) will exhibit its Delta 3000LD (long dwell) for MAP at PACK EXPO Las Vegas 2001. According to Randy Rice, vice president of sales, "It's a horizontal flow wrapper, with horizontal jaws that travel with the film to seal the package, giving maximum dwell time. We'll also have a Delta Cam (DC) similar to the LD, but its jaws travel with the cell for a shorter time, for higher line speeds."

The Delta 3000LD mechanically cycles at 140 cycles per minute and produces packages at a rate of up to 120 per minute. The cost-effective machine operates on an Allen-Bradley platform and offers increased speeds and jaw pressure. Rice uses a Number 8 poultry tray for ground turkey as an example of Ilapak's high-speed capabilities. "With our older technology, speeds of 65 per minute were the maximum, now customers can achieve speeds over 90 per minute," Rice says. In addition, changeover time between package sizes is greatly reduced.

Whatever the need to extend shelf life, there will be numerous options on display at PACK EXPO Las Vegas 2001, September 10-12, from nitrogen dosing units to impart rigidity and protect freshness to vacuum sealers, aseptic fillers, fillers/sealers for trays and cups and high-speed form-fill-seal units capable of inserting a custom mixture of gases inside packages before hermetic sealing. All in all, it will be the ideal place to find extended-shelf-life solutions.

The Packaging Machinery Manufacturers Institute (PMMI) is a trade association whose 491 members manufacture packaging and packaging-related converting machinery in the United States and Canada. PACK EXPO International 2002 will be held November 3-7, 2002 at McCormick Place, Chicago, Il, USA. PACK EXPO Las Vegas 2001 takes place September 10-12 in Las Vegas, NV.

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EXPORT HIGHLIGHTS

CASHEW

There has been a dip in Indian cashew exports both in terms of value and quantity during the financial year 2000-01. During this year, exports of cashew kernels were seen at Rs. 1,851 crore, with quantity of about 80,946 tons. However, imports of raw cashewnut increased during the same period.

CARDAMOM

Indian cardamom exports during the next season could cross 2,000 tons if the present trend in the international market is any indication. This is against the official figure of 1,500 tons. It is reported that including the UK, there are good enquiries from the overseas. There are seed enquiries from European markets as well apart from Russia, Malaysia and Singapore.

COFFEE

According to Coffee Board, India has exported a total of 1,28,548 tons of coffee from January 01 to June 20, 2001 as against 1,74,192 tons that was shipped in the corresponding period of the previous year.

TEA

The tea output of India has reportedly declined by 21%, while the exports are seen up by 19% in April this year as compared to the same period last year. Exports in April increased by 2.19 million kg at 13.29 million kg. Exports during the period were down to 51.58 million kg against 53.36 million kg the previous year.

RICE

The aromatic basmati rice exports of the country have been modest from the past few weeks, which is likely to pick up after the monsoon. According to trade reports, around 450,000 tons of basmati rice is estimated to have being exported since the beginning of the season. Further, it is estimated that the total output for this season is expected to level last year's record of 650,000 tons.

PEPPER

India has exported less than 10,000 tons of pepper from January to May in the current year, compared with 13,000 tons during the same period last year. It is felt that exports are falling due to holding back of stocks by farmers, who expect a rise in prices in the near future.

FRESH GUIDELINES FOR EXPORT OF CONSUMER GOODS

The government has issued fresh guidelines for export of consumer products with mandatory provisions for a "Made in India" logo and international quality certification. Under the guidelines issued by the Commerce Ministry, exporters have been asked to emboss their products with the "brand name" and "Made in India" logo for brand approval which must remain on the product until the point of retail sale.

Exports up to the limits of Rs. 10 crore per annum will be permitted as per the new norms for the first three years of the licensing period. The limit for exports in the case of SSI units has, however, been limited to Rs 2 crore.

These guidelines are required to be followed by exporters for obtaining approval or recognition for waiver of the value cap for exports under the duty entitlement passbook scheme (DEBP).

Bar coding of the export product and quality certificates from any of the agencies identified for granting the international quality series ISO-9000 would be mandatory for recognition under the scheme. Exporting firms are required to declare the brand names along with the export products on each of the sales bills at the time of exports.

Approval relating to exemption from the value cap shall be specific to a manufacturing unit for a branded product for which the exporting firm would have to indicate the name of the unit producing such brand products.

SPICES

In a bid to arrest the fall in export volumes of spices, the spices board plans to launch a scheme to promote branded Indian spice products in international markets. The board will encourage exporters and corporates by underwriting 50 percent of initial marketing costs incurred by them in promoting their brands, C.J. Jose, chairman, Spices Board said.

The new scheme to be launched by the board, will enable exporters and corporates in the spices business to brand processed spices in the form of powdered pepper, chilli and ginger sauces, tamarind constituents, ginger ale and ginger candy to name a few.

The US market is seen having major potential for Indian brands, given the fact that a lot of stores are dominated by Indians there. The board has urged exporters to shift focus to oleoresins and spices other than pepper. India currently exports powdered pepper in bulk to overseas buyers who re-pack, brand and sell the product at attractive prices.

Spice exports are targeted at Rs 1,700 crore in the current financial year, as compared to Rs 1,612 crore last year. Exports of spices declined 20 percent in value terms last year, mainly on account of a drop in pepper exports, due to competition from vietnam. In the current year, the export of pepper is expected to be higher in quantity terms. Export of cardamom and chillies are also expected to be higher.

The cost sharing scheme, which was discussed at the board's meeting in July, is aimed at enabling exporters to compete effectively in international markets. The scheme would also provide support for upgradation of capacities and training. In order to compete in terms of quality, the board is tightening logo certification for exporters and persuading the government to amend the prevention of food Adulteration Act and Agmark, to make them comparable to international standards, officials said.

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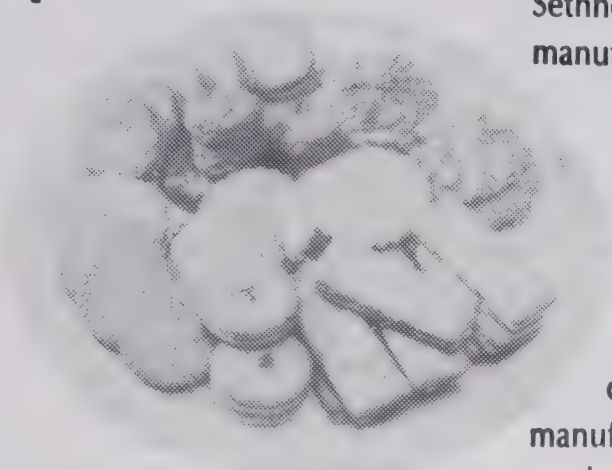

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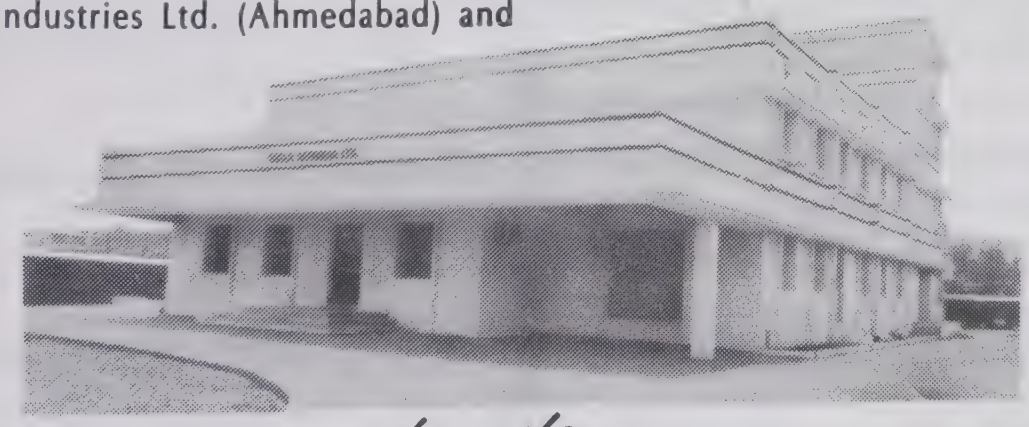

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BOOK REVIEW

SNACK FOOD PROCESSING, Edited by E.W. Lusas, Ph.D., Ed Lusas, P.S.I., L.W. Rooney, Ph.D., Texas A & M University, Published by CTI Publications, Inc., 2 Oakway Road, Timonium, MD 21093-4247 USA, Fax: 410-308-2079, Email:sales@ctipubs.com, Website: www.ctipubs.com, Pages 554, Price $ 183.

This book is the definitive book on developing, preparing and processing shelf stable savoury snacks. Chapters cover a wide range of topics, including ingredients, raw materials specifications, equipment, materials handling, sensory evaluation and quality control methods and the preparation and processing of specific snack products. Every major product type is covered including: potato and corn chips, alkaline cooked corn tortilla chips, pretzels, popcorn, extruded puffed and baked/fried products, meat snacks, and rice based snacks. International snack foods are also covered, including those in India, China and Japan. Post shaping and dying operations are discussed in detail, including seasonings, flavourings application, producer protection and packaging materials, and filling and cartoning equipment.

RAW INGREDIENT QUALITY IN PROCESSED FOODS by Mark B Springgett., B.Sc. Ph.D., Published by CTI Publications, Inc., 2 Oakway Road, Timonium, MD 21093-4247 USA, Fax: 410-308-2079, Email: sales@ctipubs.com, Website: www.ctipubs.com

This book is the first to relate different agronomic practices to different product types, and to relate all to the final safety and quality of foods and drinks. In particular, factors such as variety or species, fertilizer or feed regimes, effect of water, climate and microbiological loading can have large effects on the processing properties and final flavor, texture and color of foods.

Contents: The Influence of Primary Agriculture on the Quality of Meat • Oils and Fats in the Food Industry • The Influence of Raw Materials on the Quality of Processed Vegetables • Factors Affecting the Quality of Red Fruits • Effect of Agronomic Factors on Grape Quality for Wine Production • Control of Milk Composition in Relation to the Quality of Dairy Products. Measurement of Quality and Quality Control.

SPICES AND SEASONINGS, A Food Technology Hand Book, 2nd Edition by Donna R. Tainter, Tone Brothers, Inc., Anthony T. Grenis, Elite Spice, Published by CTI Publications, Inc., 2 Oakway Road, Timonium, MD 21093-4247 USA, Fax: 410-308-2079, Email: sales@ctipubs.com, Website: www.ctipubs.com, Pages 256, Price $ 126.

Spices and Seasonings, 2nd Edition gives the food industry professional updates of important statistics, the latest research on the antimicrobial capabilities of certain spices, new American Spice Trade Association specs, and new FDA labelling regulations. In addition to providing a general overview of the industry, this book offers practical details on specifications and formulations for the food technologist.

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LABORATORY INSTRUMENTS & EQUIPMENTS

FOR RESEARCH, EDUCATION AND INDUSTRIES

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* Electronics Balances: Swiss / Japan
* Ion Analyser & Electrodes: ORION
* LOVIBOND TINTOMETER: UK make
* BROOK FIELD VISCOMETER: Analoge/Digital

ACCURATE IN QUALITY

* Refrigerated Centrifuge
* PH Meter/Conductivity Meter
* B.O.D. Incubator / Deep Freezer
* Polarimeter/Refractometer
* Hand Refractometer 'ERMA'

BEST QUALITY

* Stirrers & Emulsifiers
* Hot Air Oven/Incubator
* Muffle Furnace
* Heating Mantles
* Test Sieves/Sieve Shaker
* Autoclave/Water Still S.S.

K.F. Titration App., Tablet Disintegration App., Dissolution Rate Test Apparatus, PLATINUM Crucible/Dishes, Silicaware Filter Paper, Sp. Gr. Hydrometer, Zeal Thermometer, Membrane Sartorius Filter Paper, S. S. Filter Holder.

LAB-INSTRUMENTS

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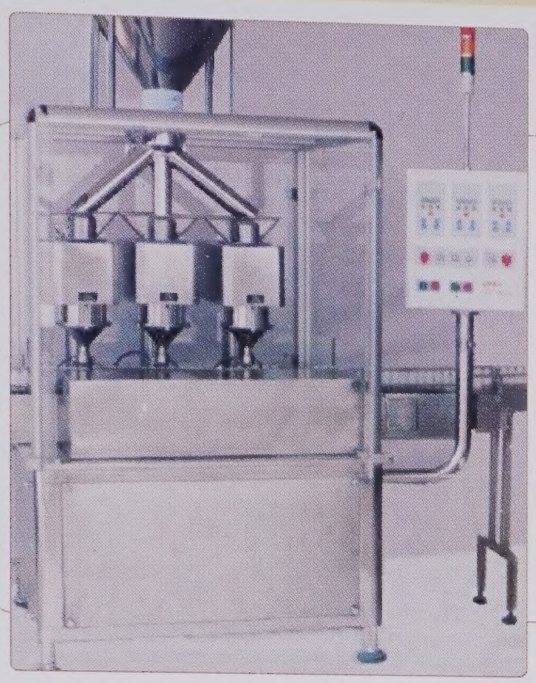

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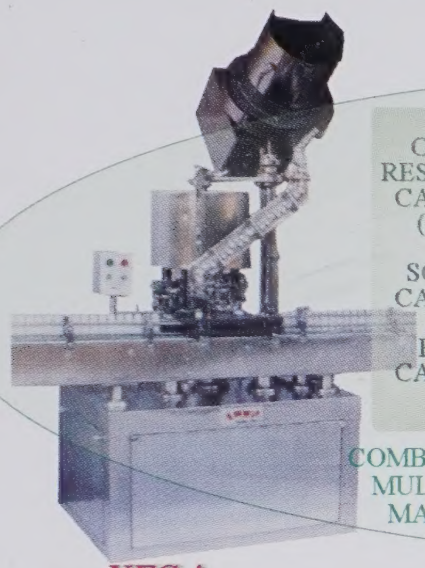

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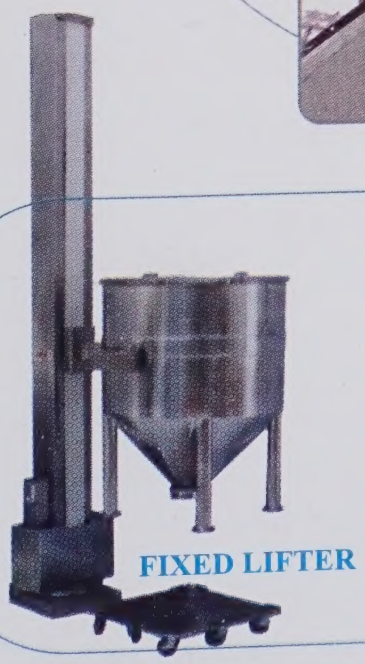
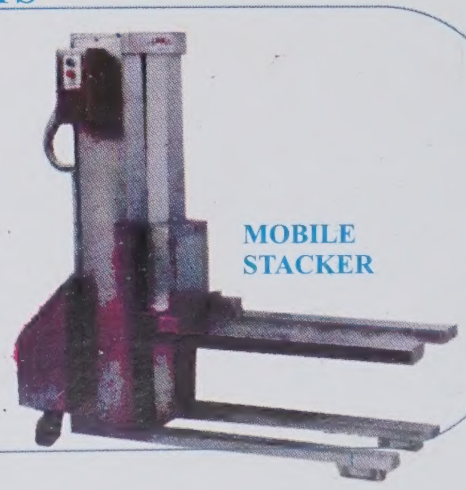
MATERIAL HANDLING EQUIPMENTS



FIXED LIFTER

LIFTER & TILTER

ROUND IPC



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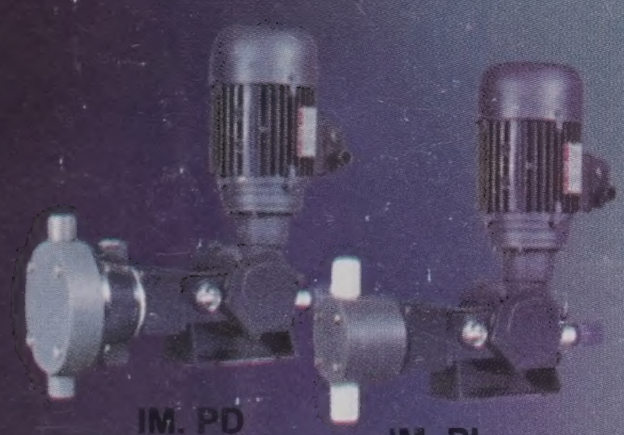

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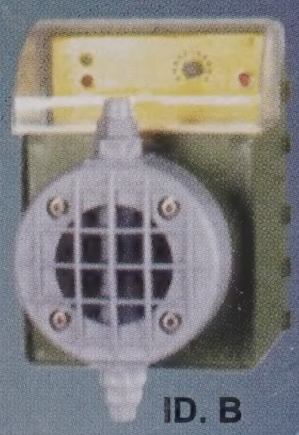

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